

532-9

JUN 6 1900 2 09 PM

PIPING AND CHIMNEYS

THE M. W. KELLOGG CO.

THE M. W. KELLOGG CO.

Manufacturers
and
Contractors

Offices: 50 Church Street, New York City
Pittsburg St. Louis

Factory: Jersey City, N. J.

Yards: South River, N. J., Port Washington, Ohio

INDEX

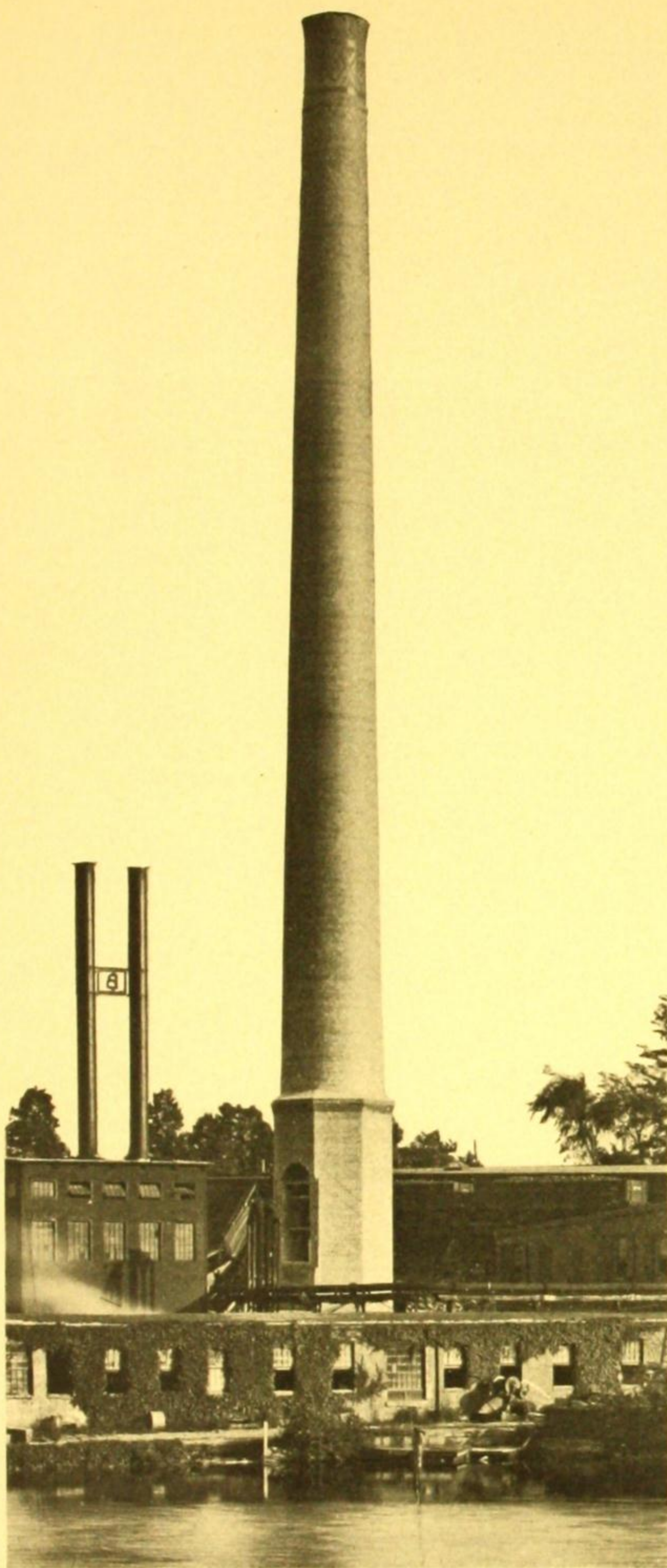
CHIMNEYS.

RADIAL BRICK	3
INFORMATION REQUIRED FOR ESTIMATE.....	5

PIPING.

VIEWS OF FACTORY, WEST SIDE AVE., JERSEY CITY.....	6-7
WELDING	8, 9, 10, 11, 12
WELDED SEPARATORS	13
BENDING	14, 15, 16
FOUNDRY WORK	17
BAROMETRIC CONDENSERS	18, 19, 20, 21, 22, 23
EXPANSION JOINTS	24
VALVES	25, 26, 27, 28, 29, 30
ERECTING CREWS AND SOME PLANTS ERECTED.....	31
VIEWS OF N. Y. C. & H. R. R. POWER STATION.....	32, 33
VAN STONE JOINTS AND FLANGES.....	34, 35, 36
WELDED FLANGES	37
SHRUNK AND PIENED FLANGES.....	38
CAST IRON SCREWED FLANGES.....	39
CAST IRON BLIND FLANGES.....	40
DRILLING TABLES	41
LONG FILET FITTINGS	42, 43, 44
TAP DIMENSIONS	45
REDUCING FITTINGS	46
REDUCING AND LONG RADIUS ELLS	47

IMPROVED RADIAL BRICK



F. W. BIRD & SONS (EAST WALPOLE, MASS.)
Height 250 feet, internal top diameter 11 feet

We suggest the use of Improved Corrugated Perforated Radial Brick as the best possible method known to-day for chimney building. The corrugation is ours and is designed and added for strength.

Corrugation occurs on sides of brick, forming radial joints in the chimney; the bricks are perforated vertically in addition to this.

Tests made by Professor Mansfield Merriman, Lehigh University, show:

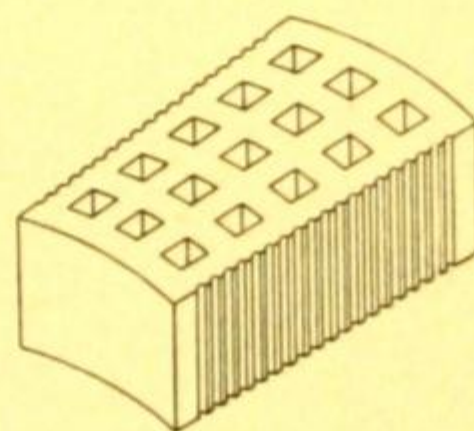
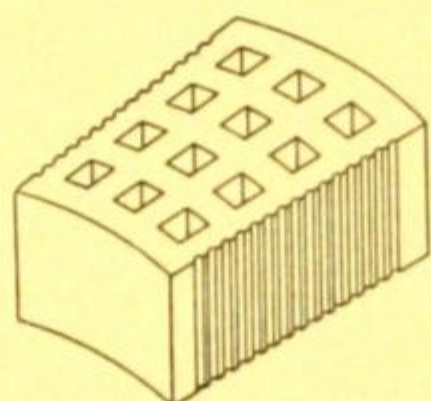
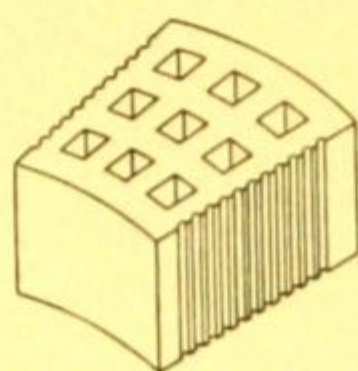
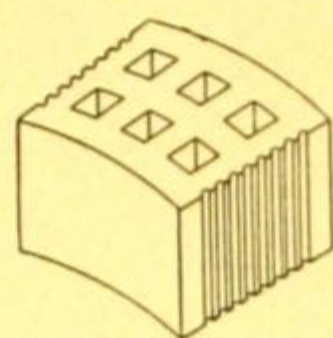
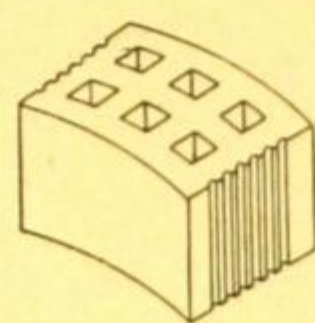
That the adhesion between mortar and our corrugated brick is 62½ per cent. greater than between mortar and ordinary straight-sided radial chimney brick.

Again, not only are our corrugated joints much the stronger individually, but the test showed that throughout a chimney so built there was no possibility of one or a dozen joints being very much weaker than the average.

The corrugation means evenness to the structure.

Variation in adhesion of corrugated joints, 29 8-10 per cent. Variation in adhesion of plane joints, 340 per cent.

Tests also showed that with straight-sided radial chimney bricks, burnt a trifle harder than they should be, adhesion between such bricks and mortar is very slight.



Various sizes of Improved Corrugated Perforated Radial Brick used to secure different Thicknesses in Chimney Walls.



PUBLIC SERVICE CORPORATION OF NEW JERSEY (NEWARK, N. J.)
Height 250 feet, internal top diameter 9 feet 6 inches

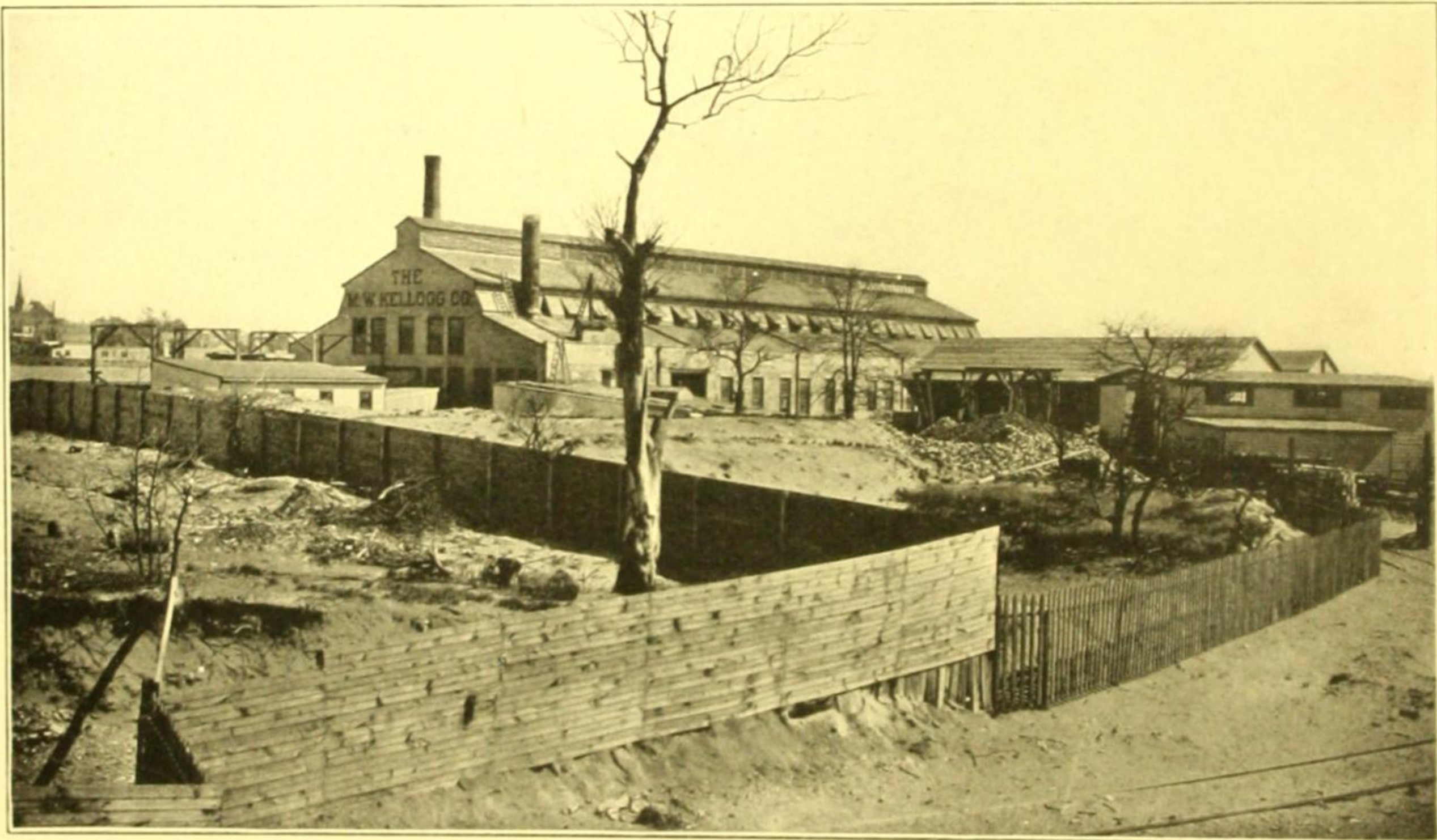
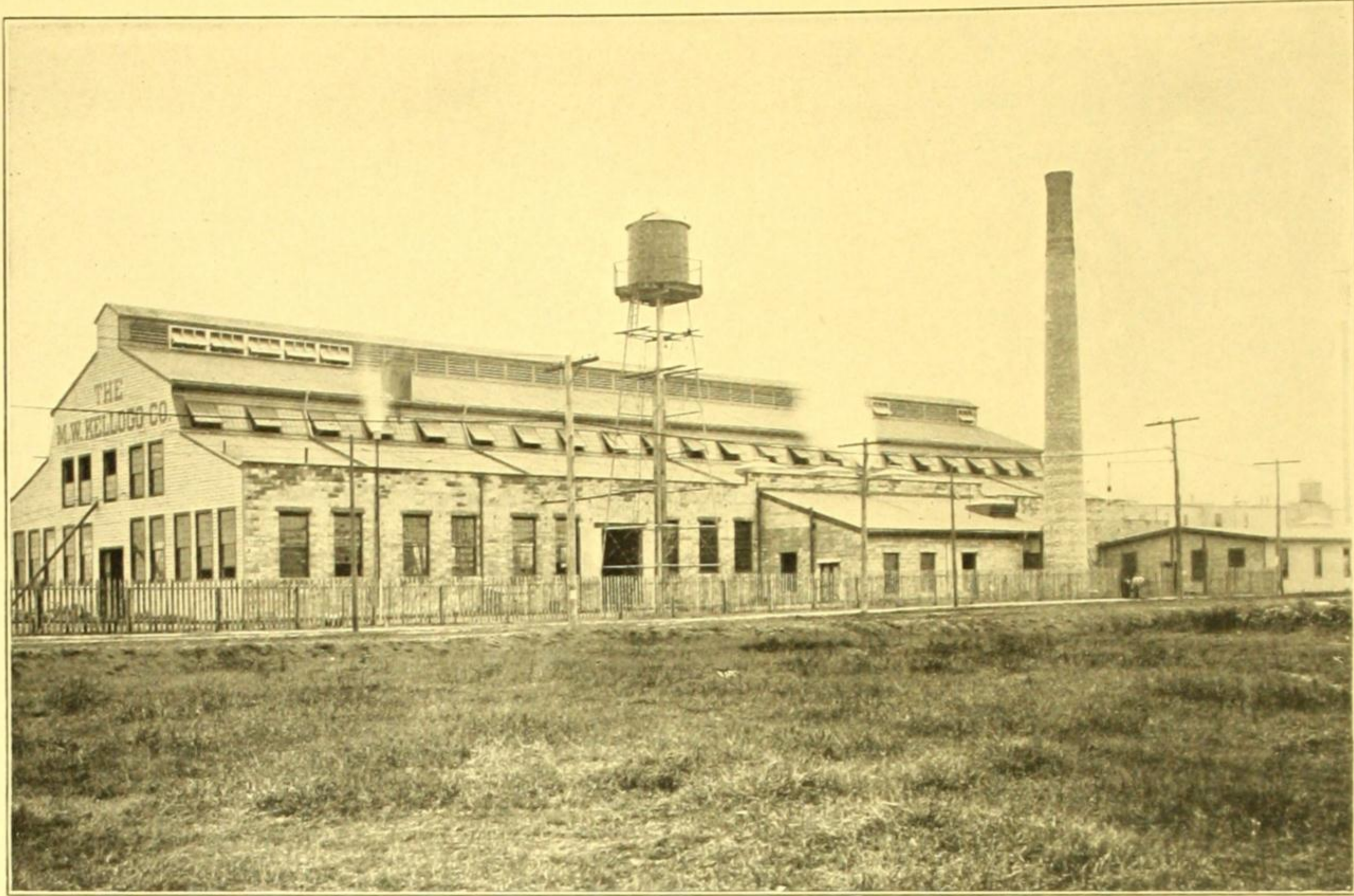
In asking for information regarding our IMPROVED PERFORATED RADIAL BRICK CHIMNEYS, answer as many of the following questions as possible referring to them by number:

1. Firm for whom chimney is required?
2. Place where chimney is to be built?
3. On what railroad is same located?
4. Can brick be shipped by water, state depth at dock?
5. Distance from track delivery or dock to chimney site.
6. Is chimney to be used for boiler draught or other purposes?
7. Give the probable temperature of flue gases.
8. If for boiler draught, what is total H. P.?
9. Kind of fuel or coal to be used.
10. Amount consumed per Horse Power, per hour.
11. Dimensions of chimney required. Internal top diameter, height.
12. Is arrangement for over-head or underground flue?
13. Size and shape of flue opening desired in chimney.
14. Distance from top of foundation to bottom of flue opening.
15. Kindly sketch on back arrangement of building, boilers and chimney.
16. What is the latest date allowed for completion of chimney?

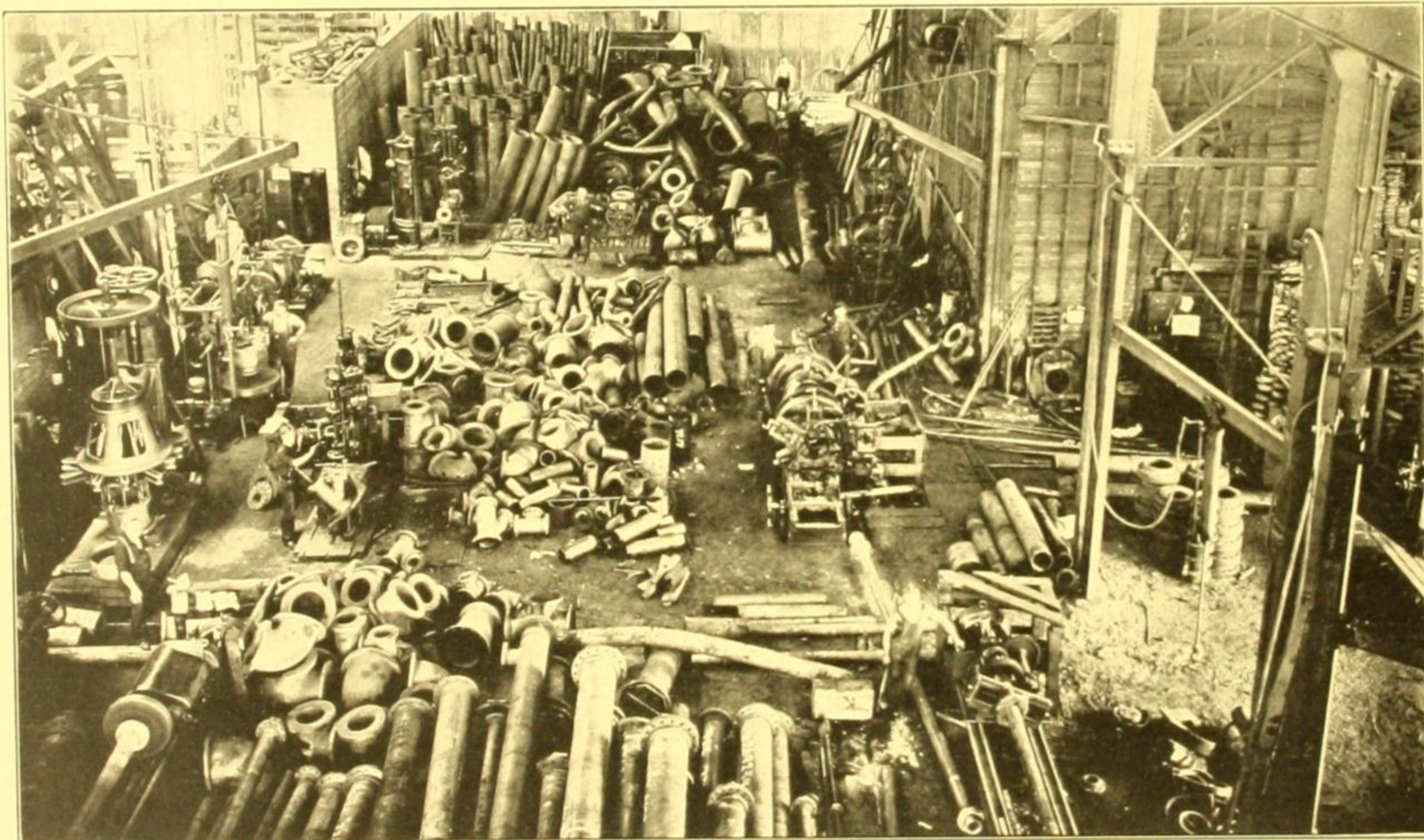
If price of foundation is required answer the following:

17. What is nature of soil where chimney will stand?
18. What is calculated safe load, per sq. ft.?
19. What depth of excavating necessary to reach good soil?
20. Will pumping be necessary during excavation?

Copies of this data sheet will be sent on request.



EXTERIOR OF FACTORY



INTERIOR OF FACTORY

WELDING

The self-evident advantage of doing away with as many joints as possible on high-pressure steam mains caused us to investigate very thoroughly all the different methods used in Europe of welding pipes together, and, after a thorough investigation between the years 1900 and 1904, we started welding outlets on piping, as well as welding pipes end to end, to accomplish this result. As is well known, this practice has been in vogue in both England and Germany for some nineteen years.

We show on the opposite page an illustration of the saving in joints caused by this method; Fig. 1 being a design with fittings where on the layout shown there are 71 joints, and Fig. 2 showing the same layout with 48 joints, or a saving of approximately one-third of the joints.

The material used by us for welding is the highest grade of open hearth soft steel pipe, which is tough and strong and low in carbon. The sizes, direction of outlets, etc., have no effect whatever on the feasibility of a good practical result.

The method of manufacture where one or more outlets are to be placed on the side of the pipe is, first, to weld the flanges on a short piece of pipe, cut the piece of pipe properly, and fit it on a hole cut in the side of the main pipe or header, these two pieces being welded together. After the whole piece is welded up, the facing and drilling is done, which assures proper lining up, position of the bolt holes, and relative position of faces, etc.

Wherever a weld is made, the metal is reinforced to from 50 to 300 per cent. greater than the original thickness. We have had tests made of the tensile strength of the metal before and after welding, and the average loss in strength through the weld, for equal areas, is about 10 per cent. Therefore, it has always shown that the net result through any part of the pipe where welding has taken place is greater than the original strength, and all material of this type made by us after being manufactured is tested to approximately 700 or 800 pounds. When outlets are welded on, the reinforcing is approximately 250 per cent:

The benefits obtained by the installation of welded material are:—

First. Saving in maintenance, due to the saving in the number of joints, etc.

Second. Saving in building construction, due to the lightness of this type of work.

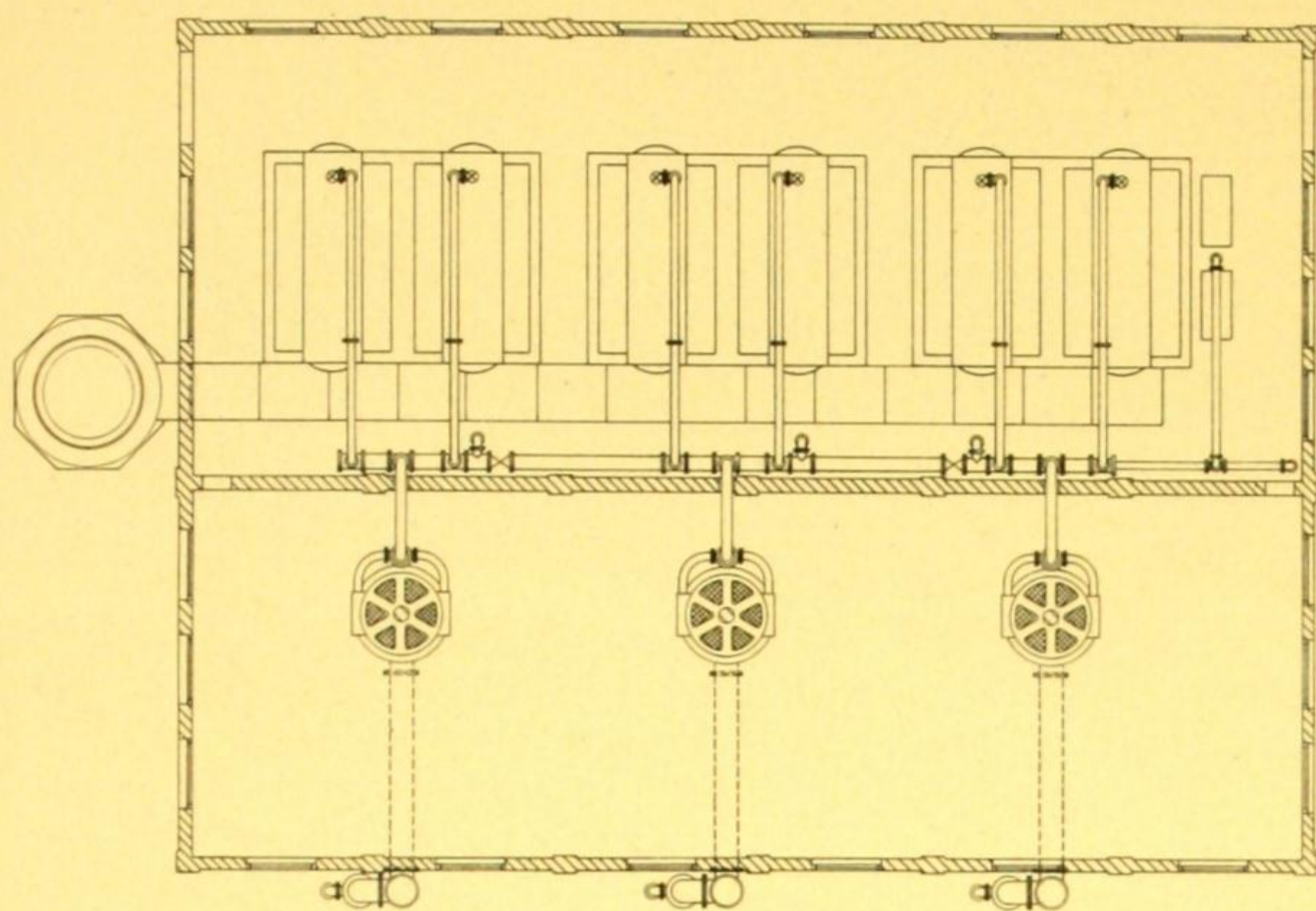
Third. Saving in labor of erecting material, due to less number of joints to be made up and the lighter weight of material to be handled.

Fourth. Saving in first cost of covering, due to the fact that there are fewer fittings and flanges to be covered.

Where plants contemplate the use of highly superheated steam, there need be no fear whatever of the type of material used giving trouble, due to the fact that the loss in strength of open hearth steel pipe, when raised to a temperature of 575° , is only approximately 1.1 per cent., and when raised to 750° , there is a loss of only 8 per cent.; whereas, it is well known that cast iron loses strength so rapidly after about 375° that it should never be used.

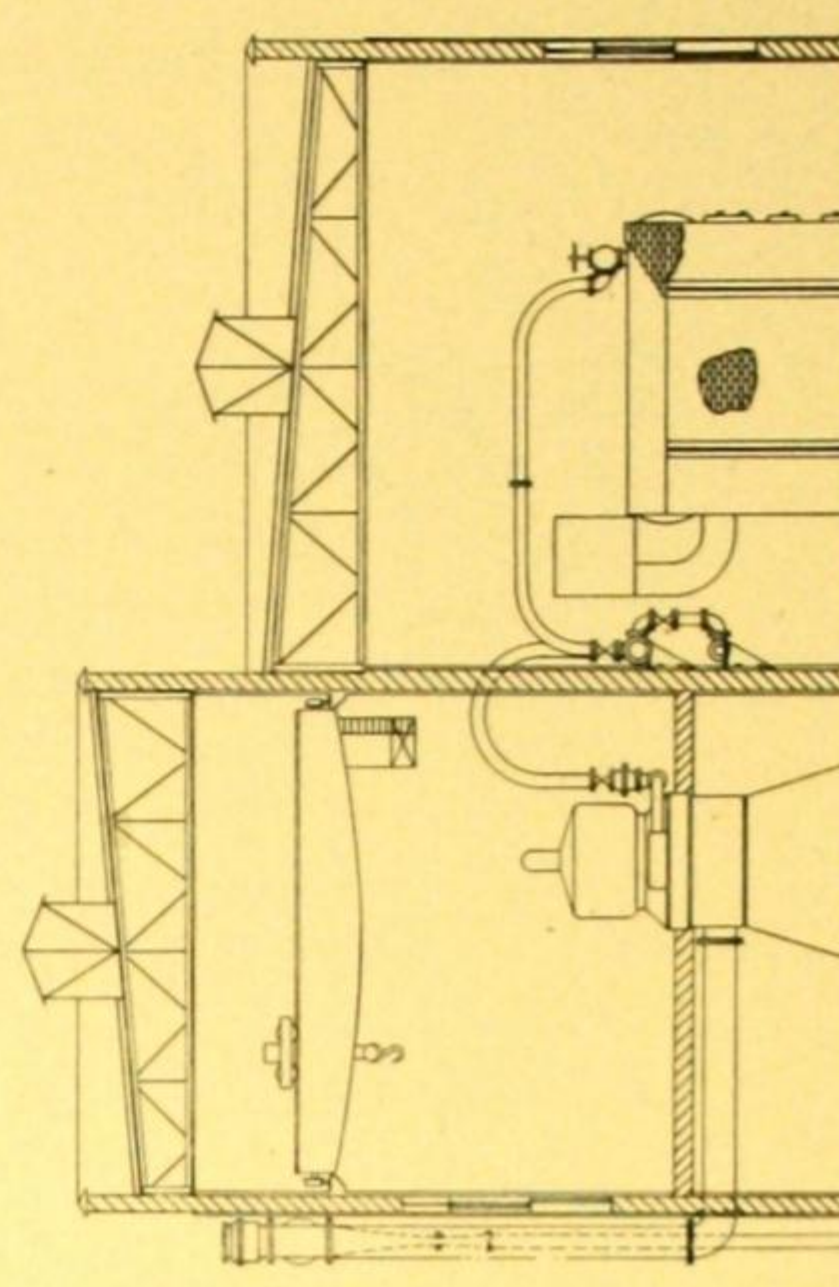
We show in the following pages some illustrations of different pieces made by us.

The welding process used in making extremely short radius bends, is illustrated and described on page 16, under "Bends with a Weld."



*SAMPLE HIGH PRESSURE PIPE LINE
WITH FITTINGS & JOINTS AND PIPE AS IT COMES FROM THE MILL
71 JOINTS*

FIG. 1



*SAMPLE HIGH PRESSURE PIPE LINE
WITH WELDED HEADER AND LONG LENGTHS OF PIPE
48 JOINTS*

FIG. 2

SAMPLE OF WELDED NOZZLES

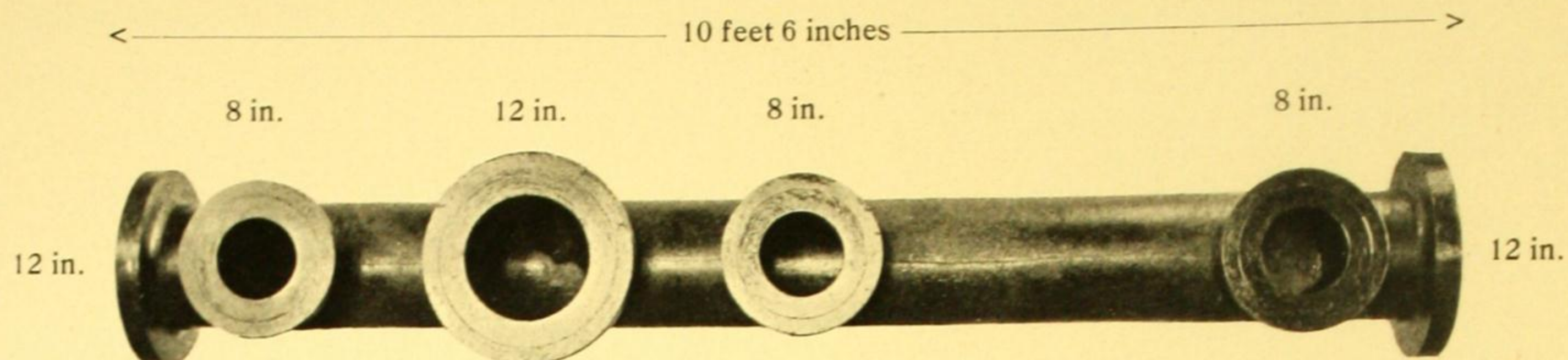


FIG. 3

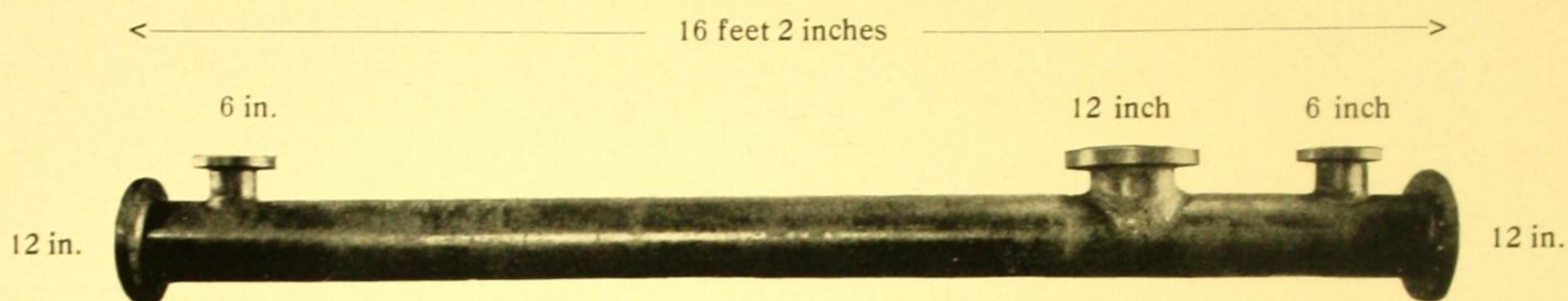
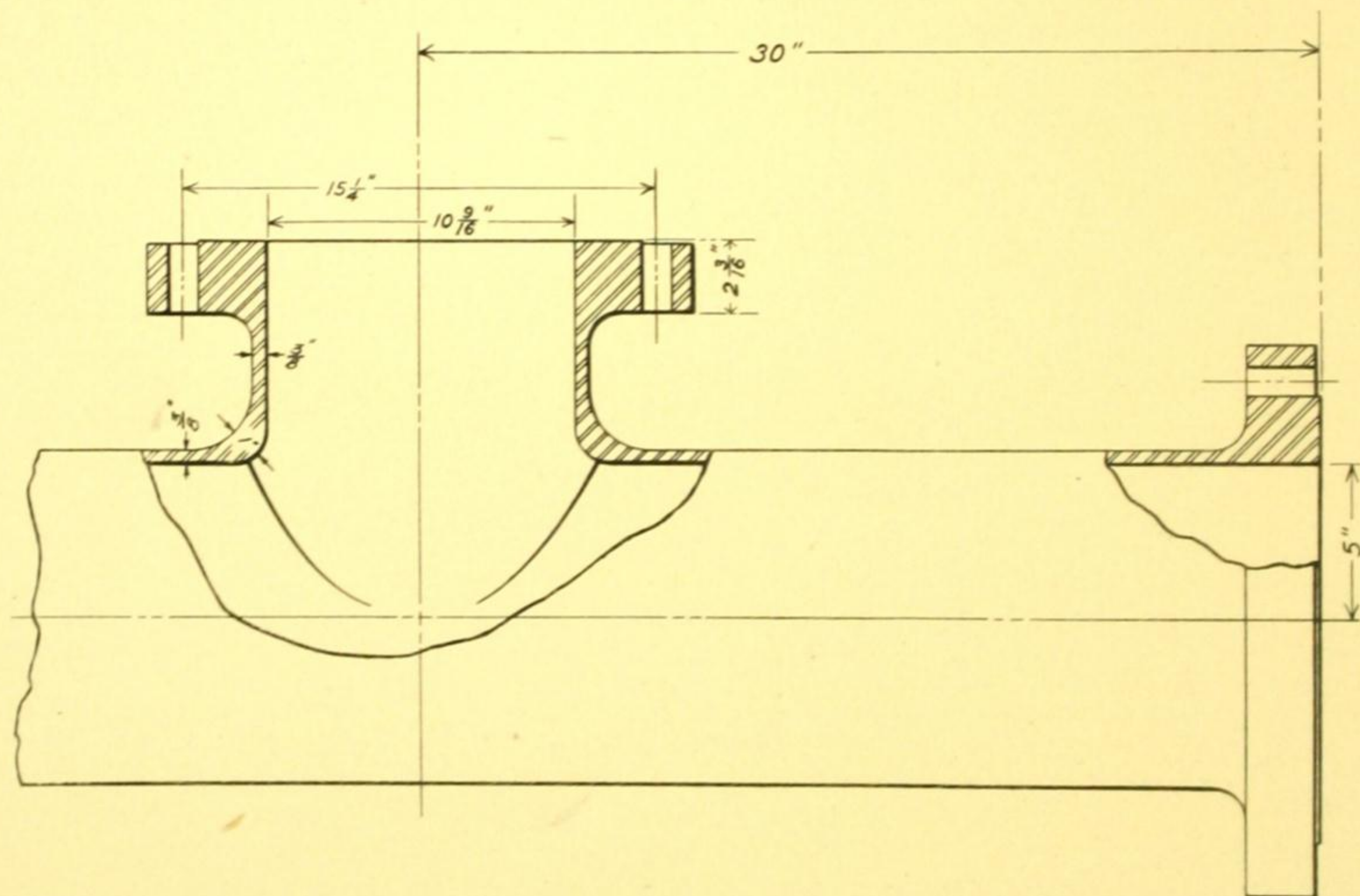


FIG. 4



SECTION OF WELDED NOZZLE AND WELDED FLANGE

FIG. 5

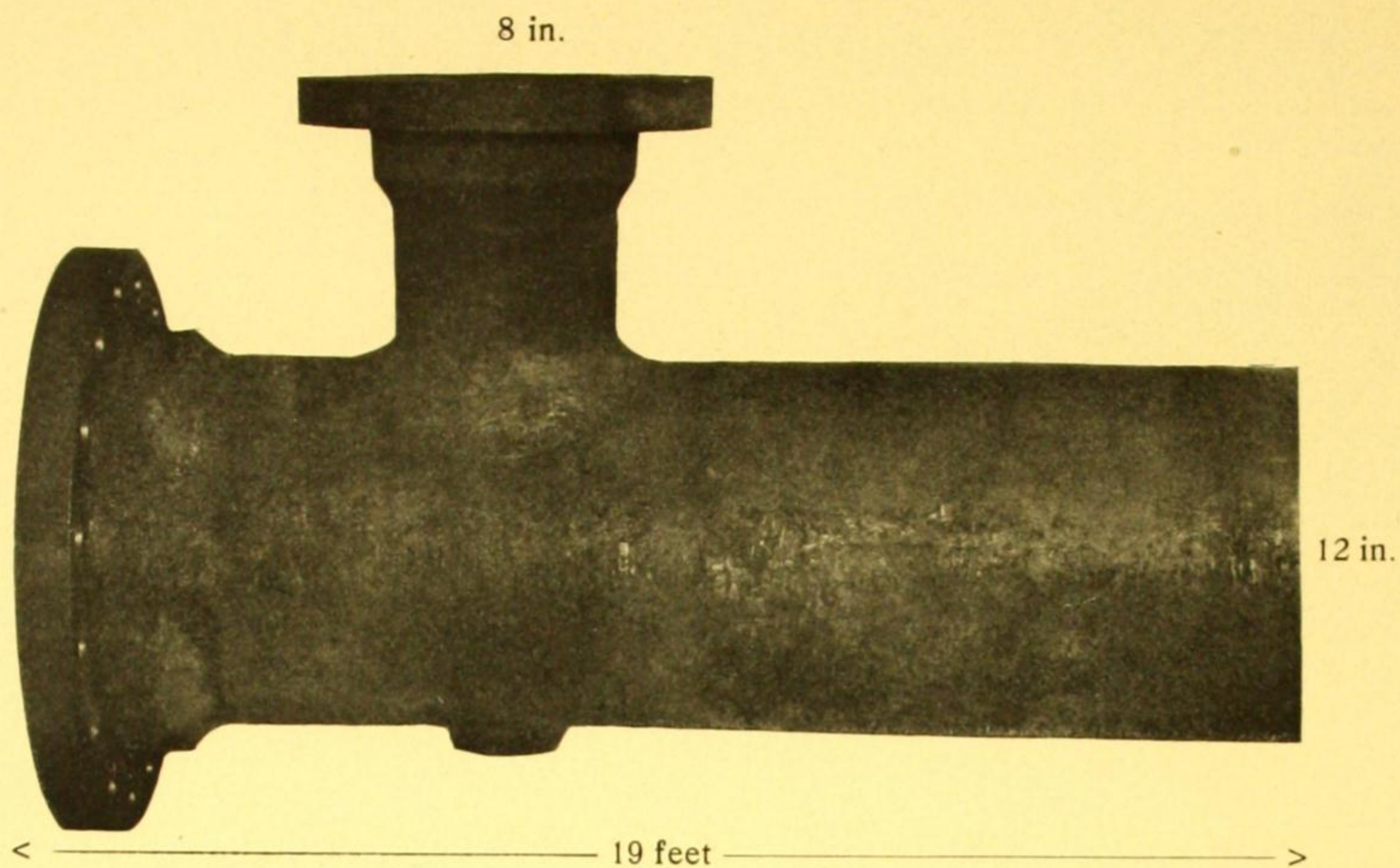


FIG. 6

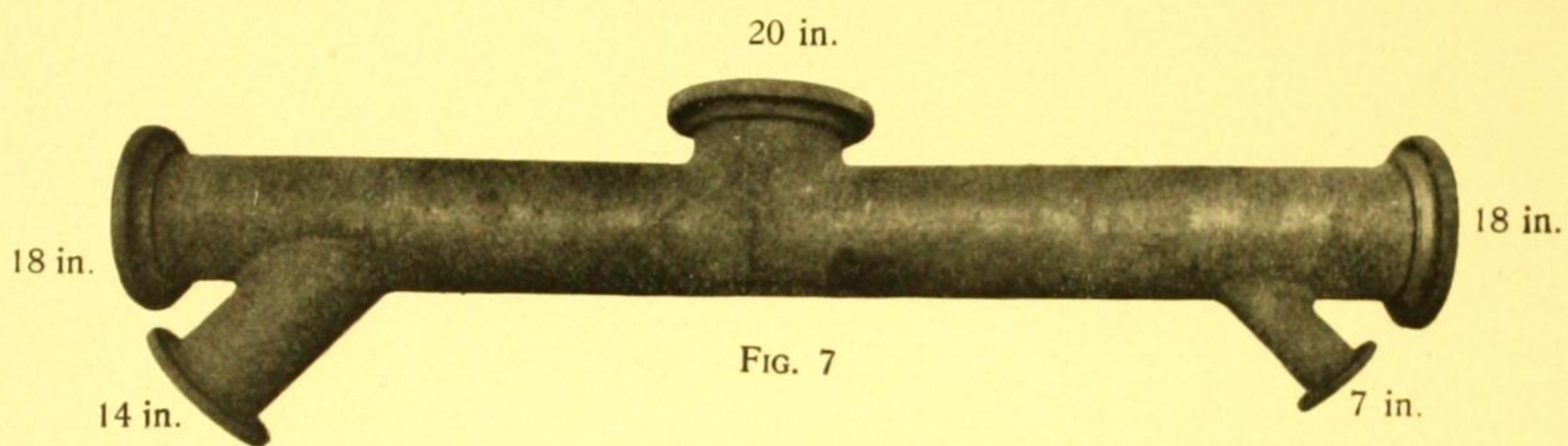


FIG. 7

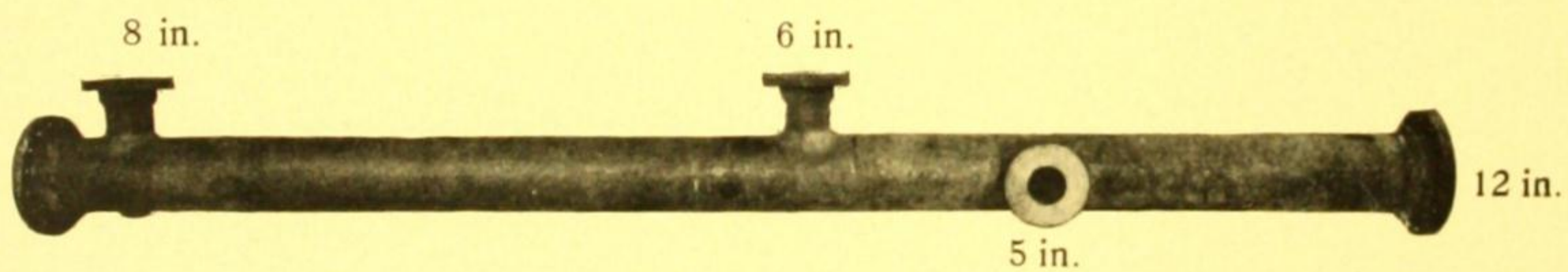
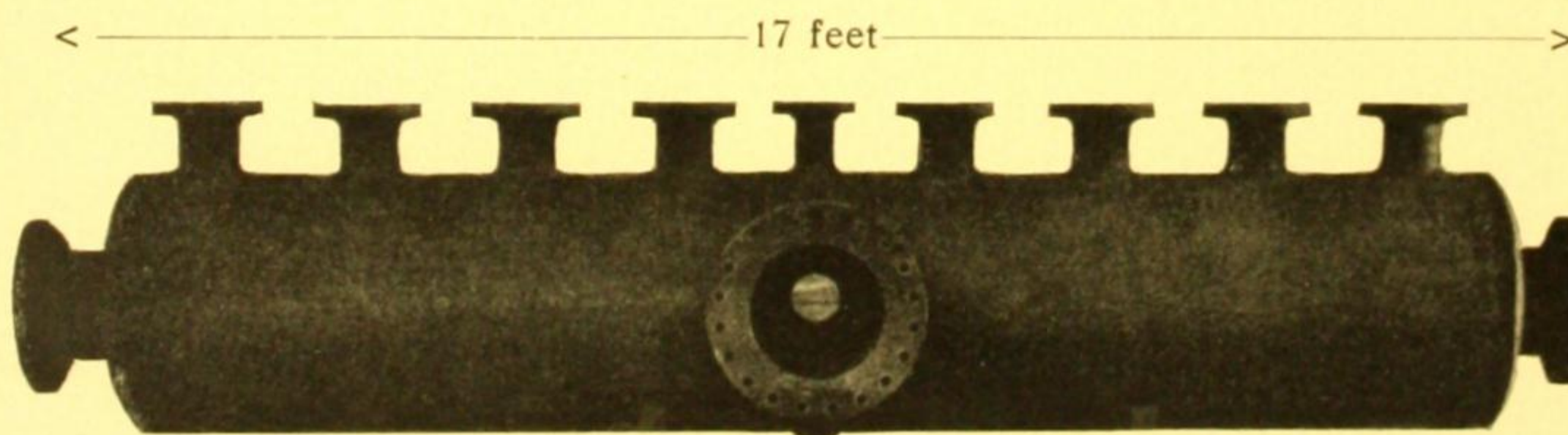


FIG. 8



30-INCH WELDED RECEIVER OF OPEN HEARTH STEEL

FIG. 9

LONG LENGTHS OF WELDED PIPE

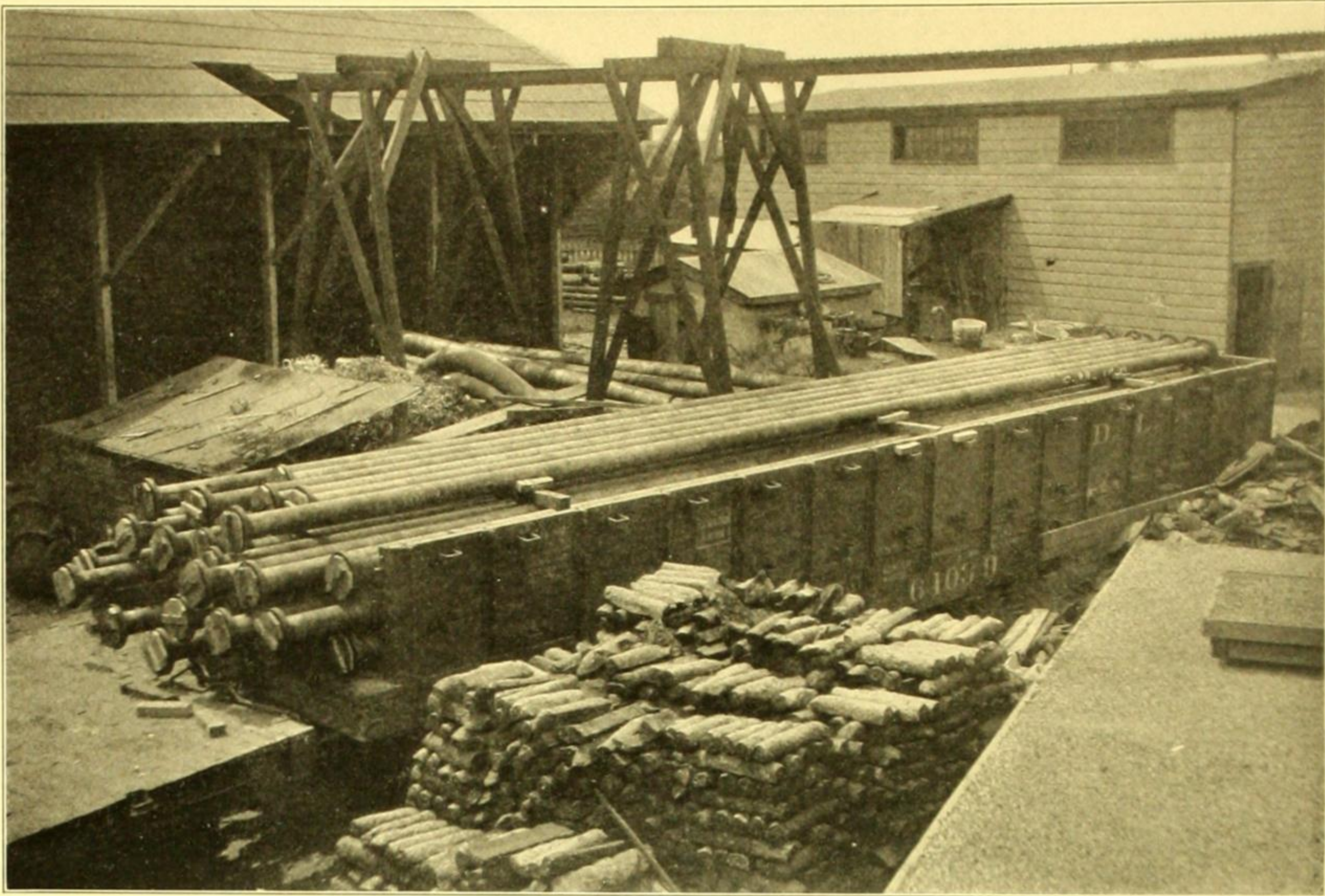


FIG. 10 CARLOAD 6-INCH PIPE, ALL LENGTHS OVER 40 FEET
HIGH PRESSURE STEAM LINE FOR D. L. & W. R. R. HOBOKEN IMPROVED VAN STONE JOINT. TOTAL
LENGTH OF LINE, 2,200 FEET.

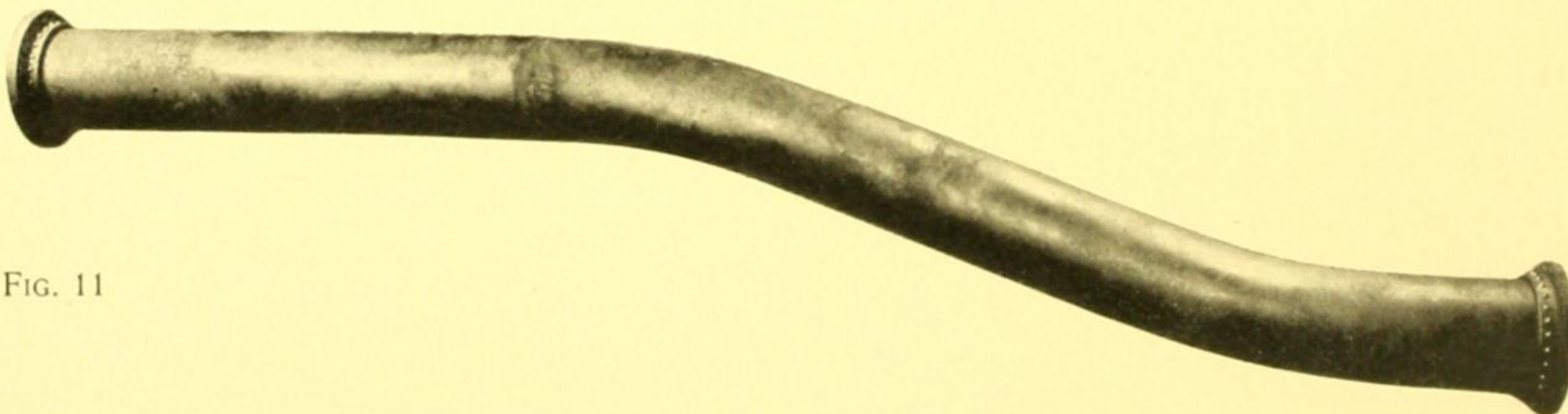


FIG. 11

24-INCH BEND, 36-FEET LONG. SUPPLIED YOUNGSTOWN SHEET AND TUBE CO.

The illustrations on this page show the possibilities of long lengths of pipe obtainable by our welding process. The only limit to the length of pipe to be welded in one piece is the limit set by erection and transportation facilities.

WELDED SEPARATORS

There has always been a demand for a superior steam separator, and particularly a receiver steam separator of superior quality, for use in high-class power stations. For this reason, we have developed what we think is the finest separator made. It is simple in construction, as you will note from the accompanying cut.

The points of advantage are that the separator is made of open hearth steel throughout, having no joints whatever with the exception of the inlet and outlet flanges. The accompanying sketch shows a small opening at the top, which was put in on account of the requirements of the customer on this separator, who wanted a hole through which he could look into the separator and if necessary use as a hand hole.

All the body of the separator is welded together, the top and bottom heads being welded on and the outlets being welded on. The flanges are made of rolled steel, and are also welded on.

Another desirable feature is the matter of weight, as separators of this type will run in weight approximately 25 per cent. lighter than a separator of equal size and capacity made with riveted shell and cast iron or steel castings on the top, bottom, and outlets, and nearly 35 per cent. or 40 per cent. lighter in comparison with separators made of cast iron or cast steel throughout.

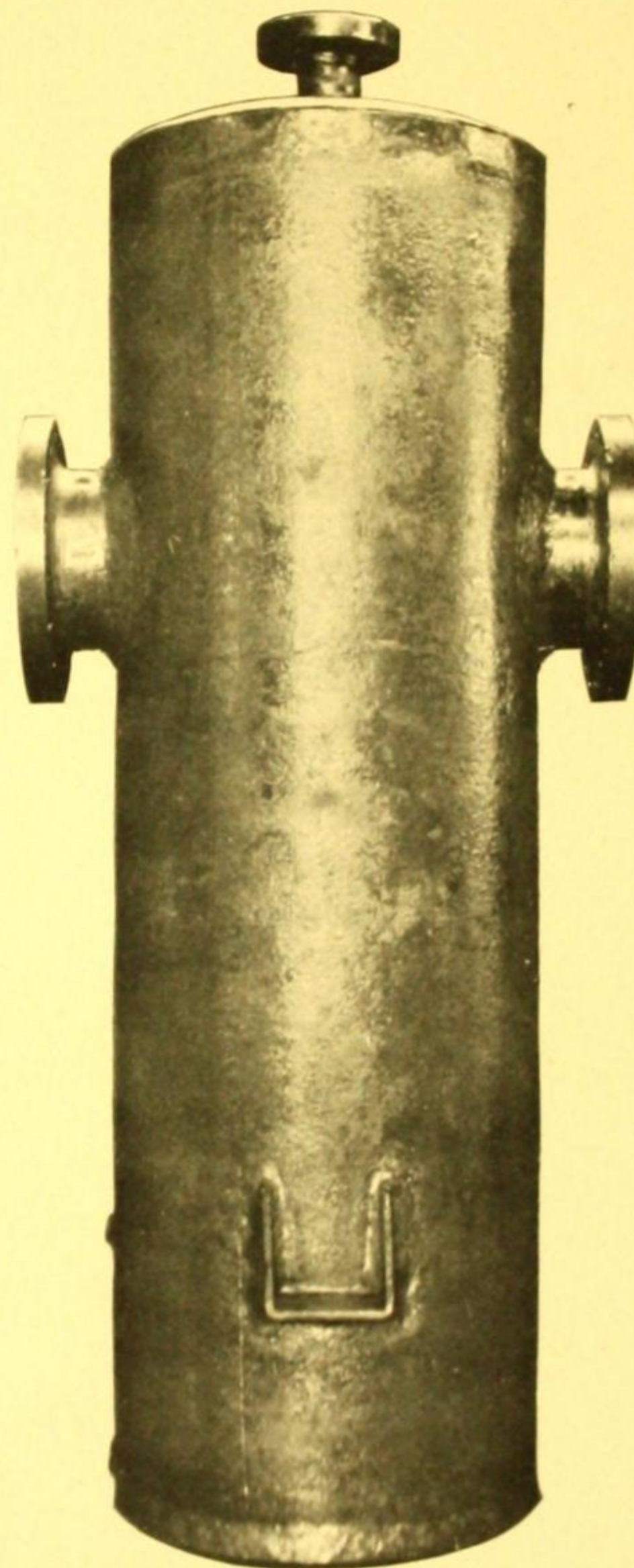
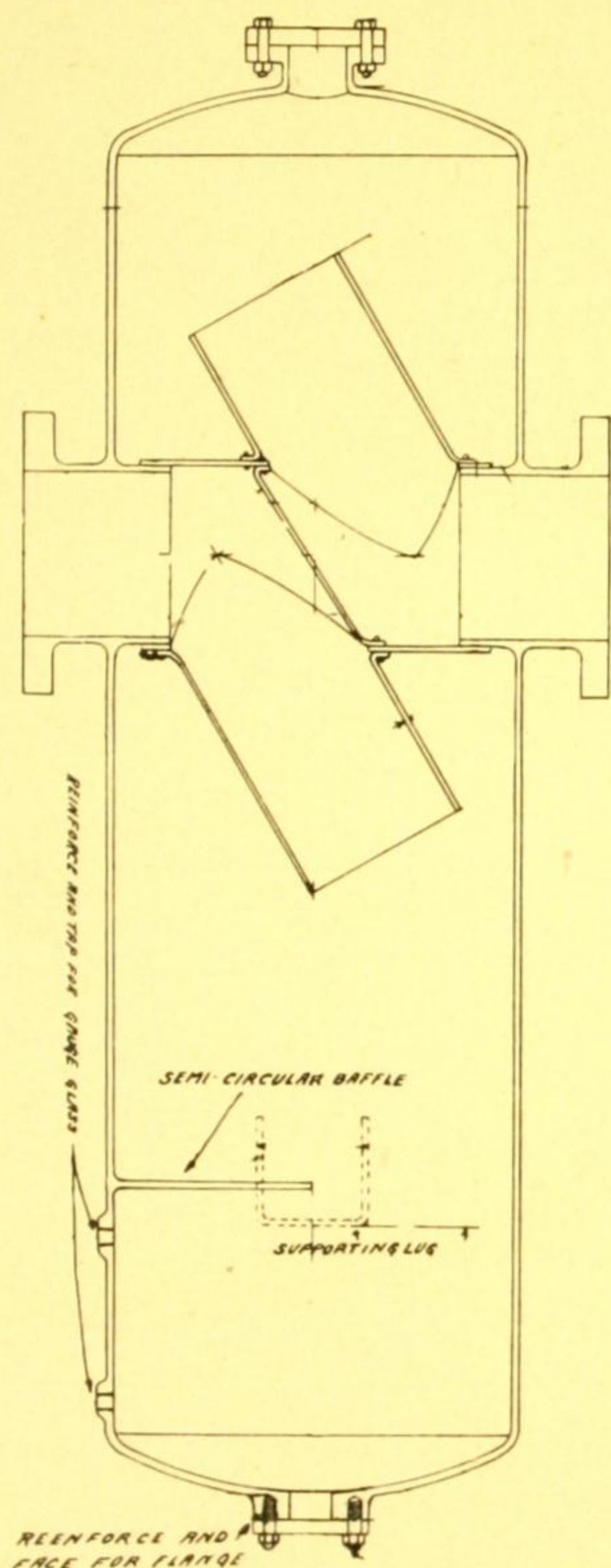
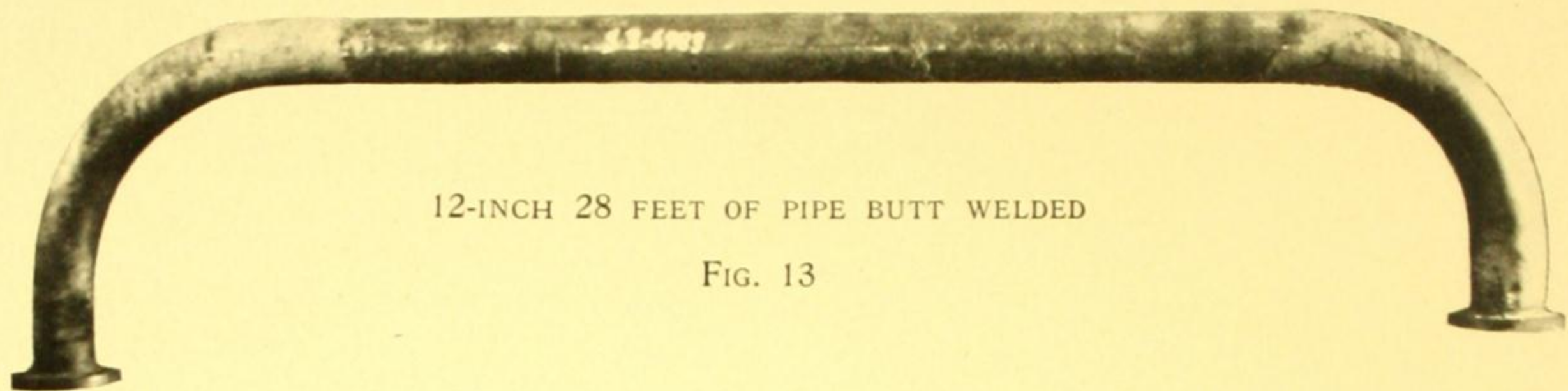


FIG. 12

BENDING

Inasmuch as wrought iron bends are more elastic—that is, take up expansion—also, as they are usually made with longer radii than fittings, it seems to us desirable that bends be used wherever possible in lines, to take the place of fittings. We have developed the art of bending to a high degree, and give opposite some cuts of bends made by us. You will note figure 16 shows an expansion bend. In all instances, the lineal feet of pipe used is over a full length.



12-INCH 28 FEET OF PIPE BUTT WELDED

FIG. 13

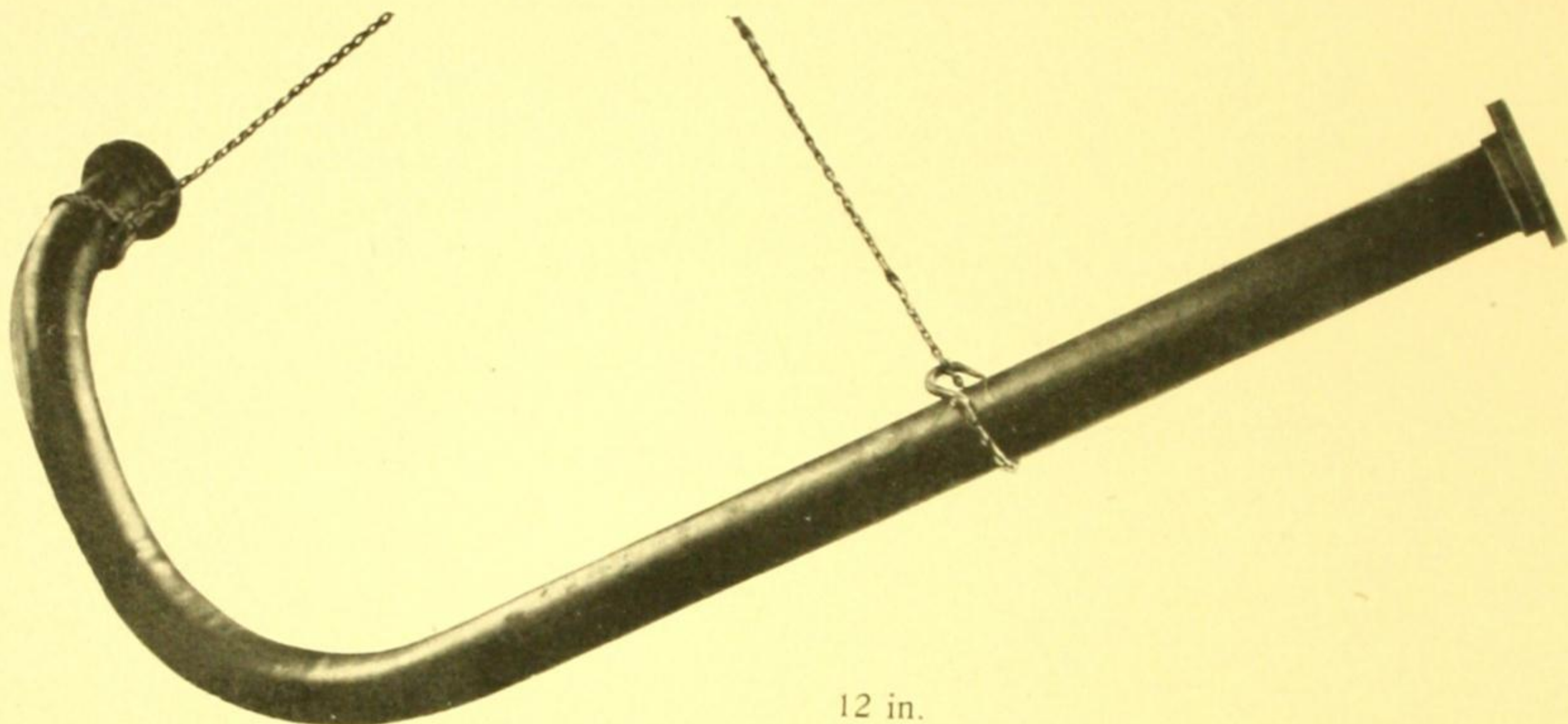
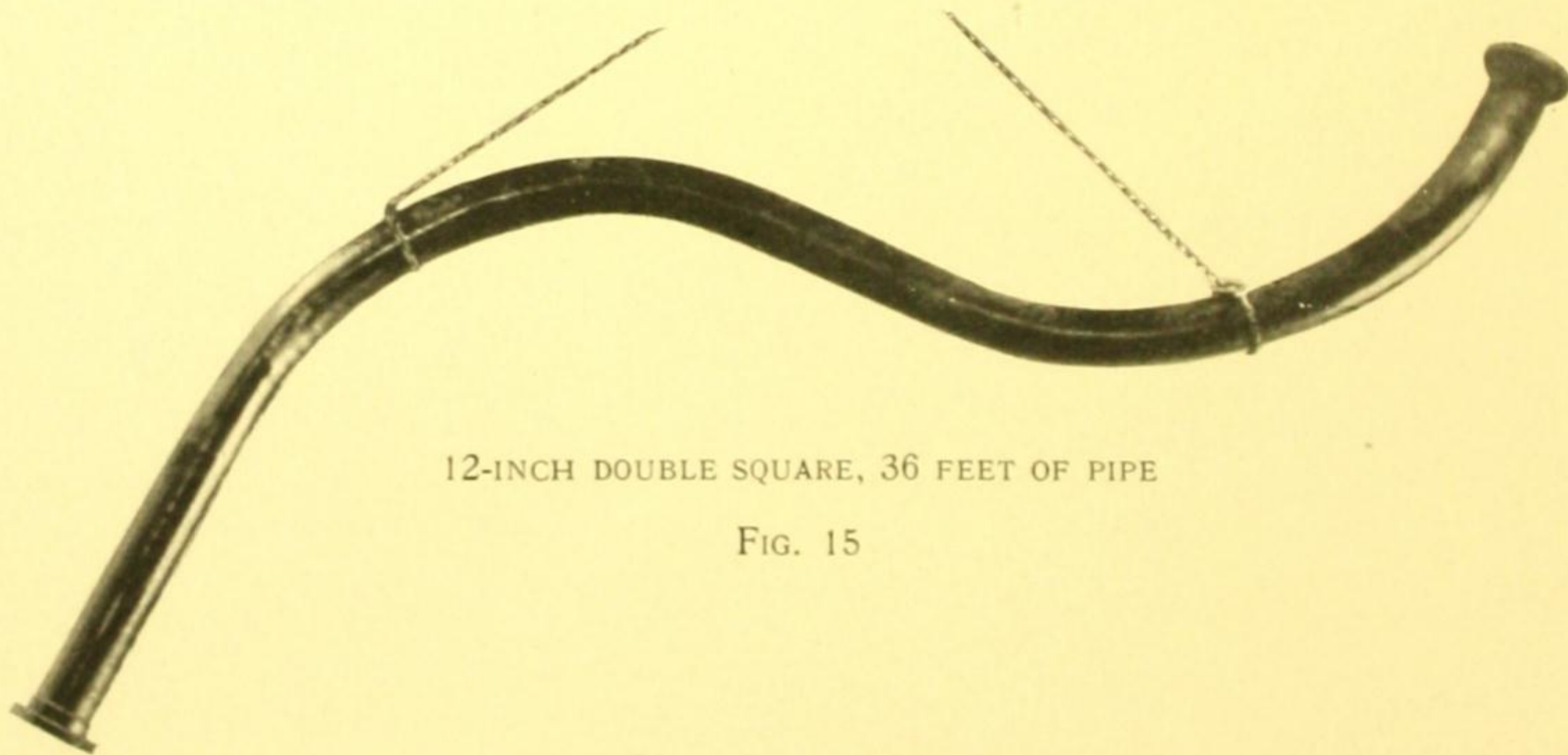


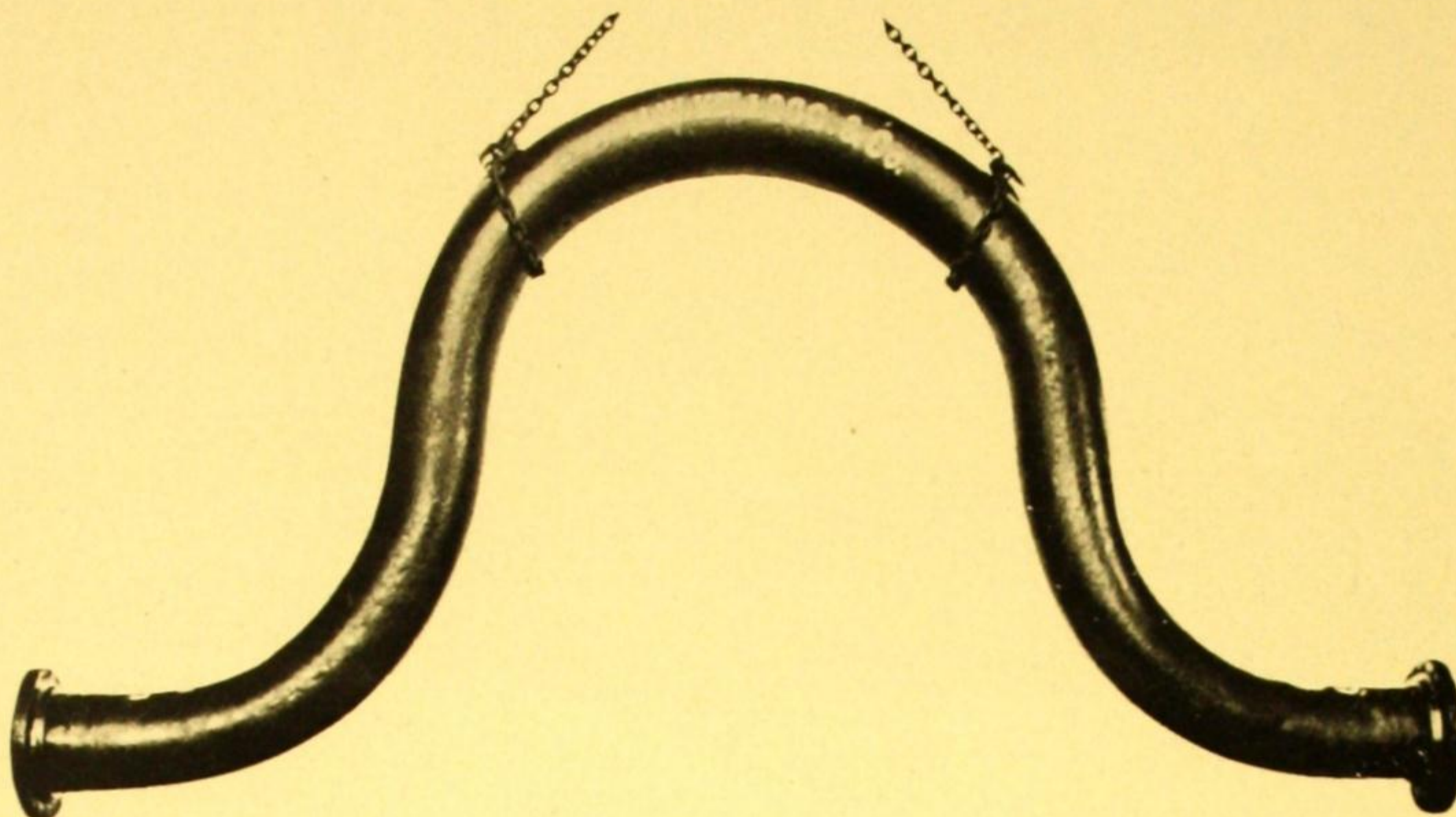
FIG. 14

12 in.



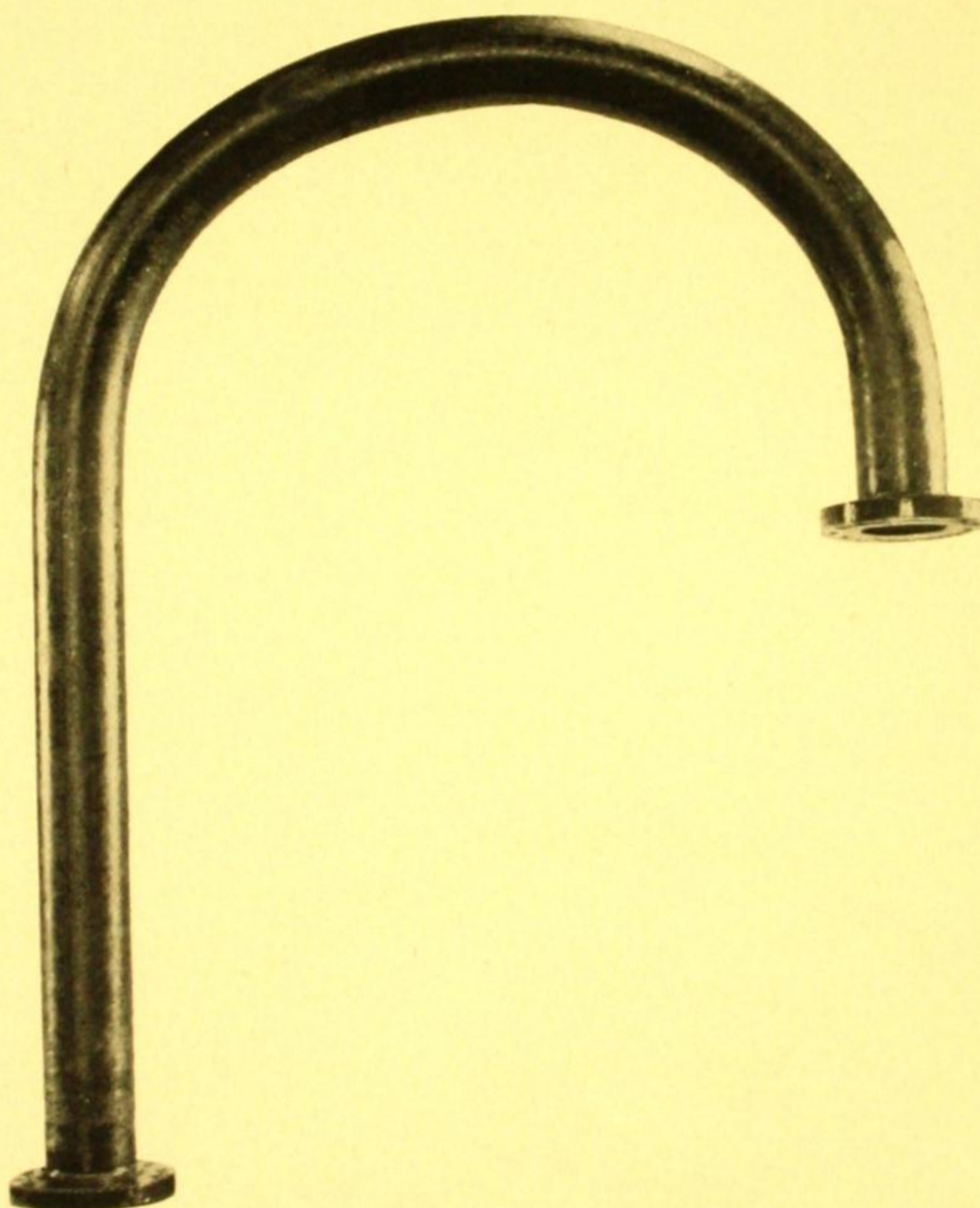
12-INCH DOUBLE SQUARE, 36 FEET OF PIPE

FIG. 15



12-INCH EXPANSION BEND

FIG. 16



7-INCH U BEND, WELDED FLANGES

FIG. 17

BENDS WITH A WELD

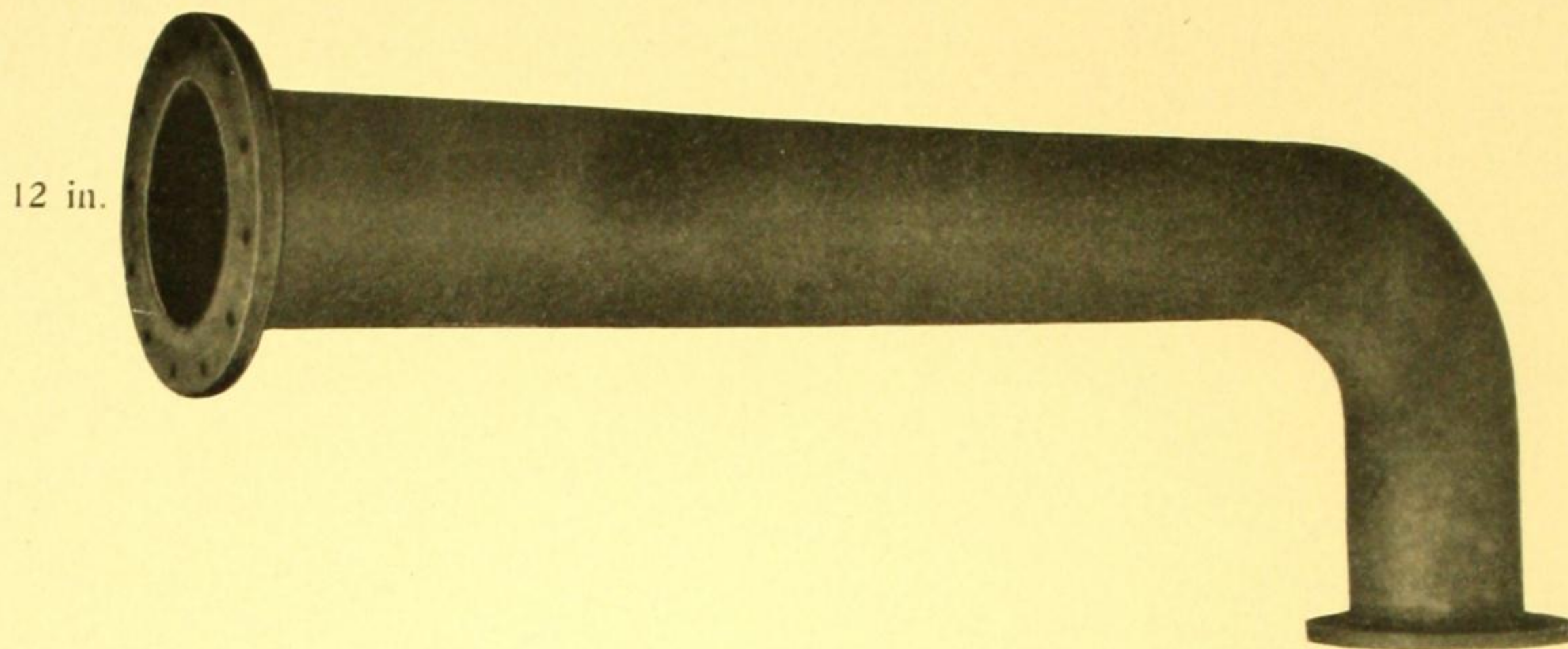


FIG. 18

Where wrought iron bends are required with very short radius, we can make them, without decreasing the strength or the thickness of the metal, on a very short radius. We illustrate in Fig. No. 18 a 12-inch bend, made on an 18-inch radius.

The method employed is to cut the side of the pipe in the beginning, bend the pipe over, and weld it up afterward, insuring full strength on the bend. This enables a wrought iron bend to be placed in a line where otherwise a special fitting might have to be made.

FOUNDRY

Owing to the continual delays we had in buying castings outside, and to the impossibility of having shipments of castings made in such a way as to facilitate speedy erection, we found it advisable to establish our own foundry. We, therefore, now absolutely control the production of all the material we sell, and in cases of urgent need can make very quick shipments, even on very special types of castings.

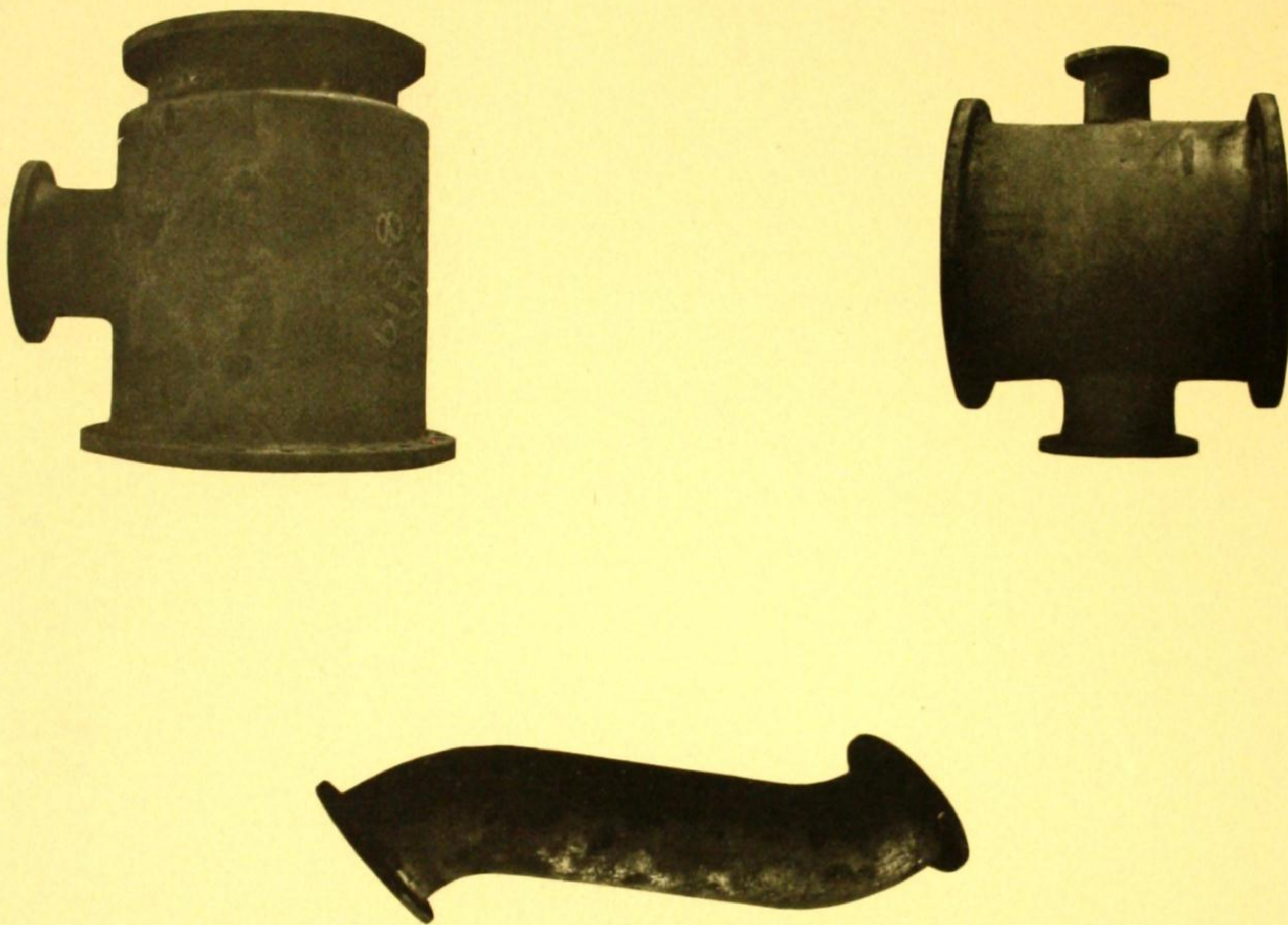


FIG. 19

THE KELLOGG BAROMETRIC CONDENSER

The Kellogg Barometric Condenser is very simple in construction and efficient in operation. It makes use of the well known principle of the injector to dispel the air and noncondensable vapors from the system, thus dispensing with a dry vacuum pump or mechanical air exhauster.

By referring to the accompanying cut, its construction and operation will be apparent. The condenser consists of an iron casting, bored, ground and reamed to the required dimensions, and fitted with a heavy brass cone, of special composition. Water enters the system at B (Fig. 23, p. 20) and circulates in the belt about the brass cone C, falling through the annular space G between the outer circumference of the brass cone C and the inner surface of the casting, and forming a moving cone of water D with a sharp vortex. Steam enters at A, passing through the interior of the cone C, and meets the water at G, imparting to it what velocity it has on being condensed; this tends to force more water through the annular space. The condensed steam, water and noncondensable vapors are brought down to the vortex D and taken by the falling water through the contracted throat F. The lower portion of the condenser expands until it is the same size as the tail pipe E. This allows the air and noncondensable vapors which have been brought through the contracted throat F to expand, thus making it impossible for them to get back into the condensing chamber. They are, therefore, taken down through the tail pipe and delivered into the hot well. A vacuum which will raise mercury against the action of gravity one inch will raise water 1.132 feet, therefore, if there was a perfect vacuum in the chamber of the condenser it would raise a column of mercury 30 inches and a column of water 34 feet against the action of gravity. A vacuum of 28 inches in the chamber would, therefore, support a column of water in the tail pipe 31.6 feet high. If the contracted throat is, therefore, placed slightly higher than this from the level of the water in the hot well any amount of water added to the top of the column will discharge a corresponding amount into the hot well from the bottom of the tail pipe. By this well known principle of the Barometric column the injection water and noncondensable vapors are discharged from the system without the use of a pump. The engine or turbine is protected from water being pulled over into the exhaust pipe by placing the upper flange of the condenser higher than 34 feet above the level of the water in the hot well. It is, therefore, unnecessary to rely upon any vacuum breakers or check valves to protect the units from damage from this source.

The injection water can be supplied by any low service pump of the piston or centrifugal pattern, or if a head of water of 17 feet or more is available above the lowest level at which the hot well can be drained, a circulating pump can be dispensed with. On account of the syphon action of the condenser the pump lifts the water only against the following heads: difference in level between intake to pump and overflow at hot well, if any; difference in level necessary to cause the flow and to overcome the friction of the pipes, etc.

This condenser is especially applicable to turbines, where the absence of air leaks and the steady flow of steam make it a simple matter to carry 28 inches of vacuum referred to a 30-inch barometer.

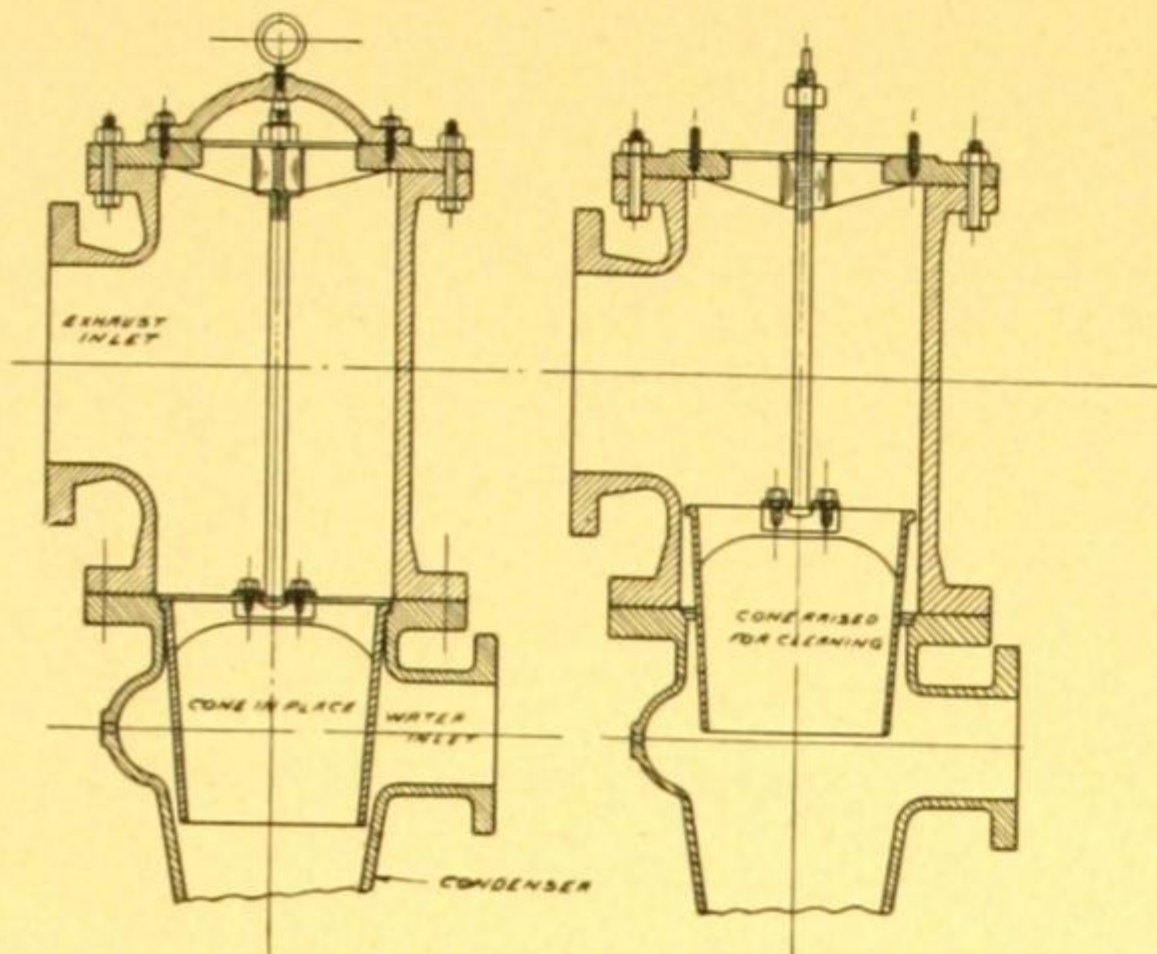


FIG. 20

SPECIAL HEAD, SHOWING LIFTING AND CLEANING DEVICE

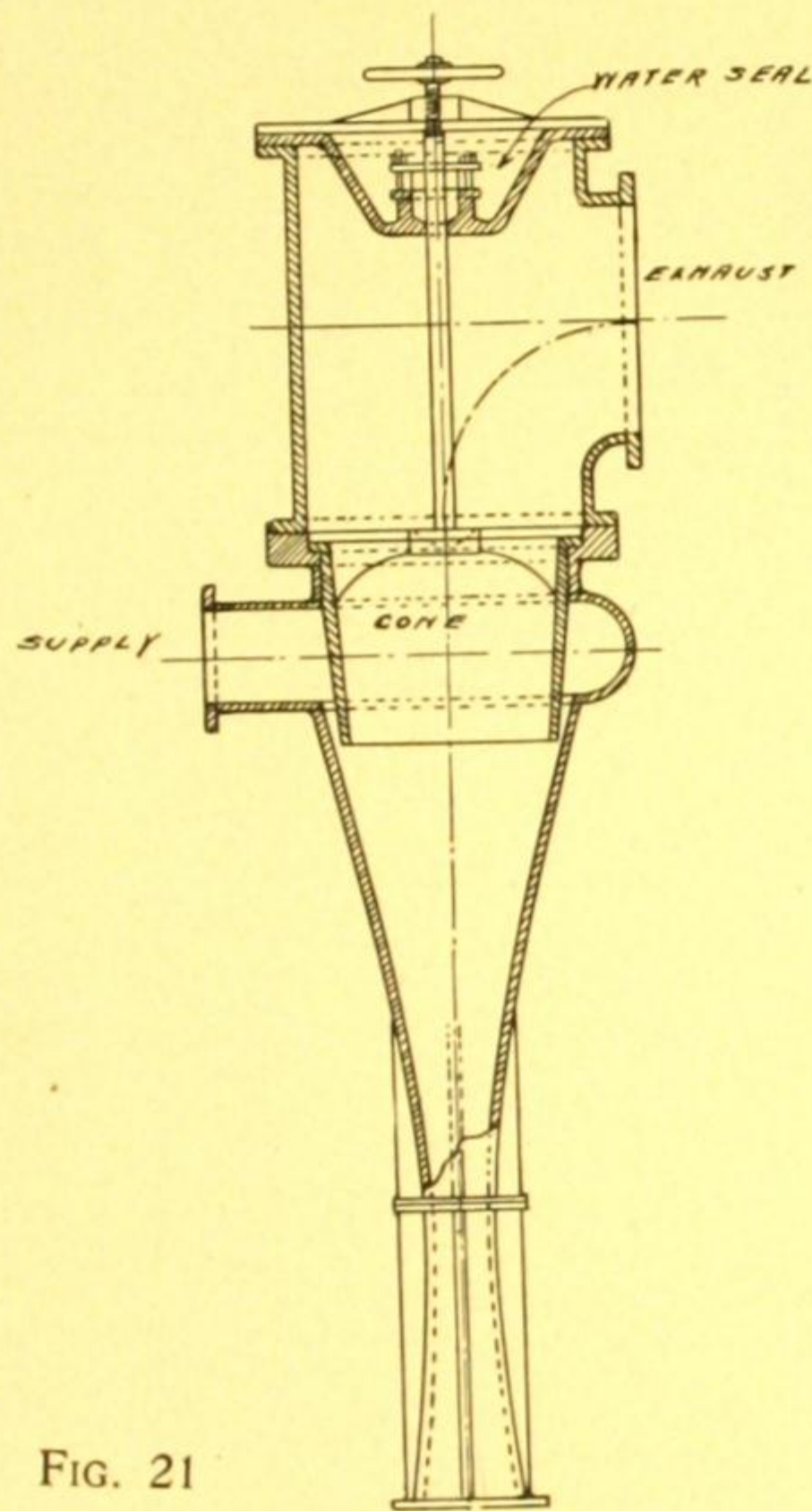


FIG. 21

SPECIAL CONSTRUCTION FOR LARGE SIZES, SHOWING REMOVABLE AND ADJUSTABLE CONE

barometer.

FIG. 20 illustrates the special head which we use with this condenser. On account of the necessarily small annular space between the brass cone and casting, this space is apt to become clogged with foreign matter. In other condensers of this type on the market it is necessary to remove a heavy elbow on the top of the condenser to lift the cone from its seat. In our construction this operation is accomplished by removing the small cap on top of the special head, and screwing the spindle up with a wrench. This causes the cone to rise and allow any obstruction which may have collected to pass down through the throat into the tail pipe. If it is necessary to remove the cone, the same can be done by removing the flange on the top of the special head and lifting the cone and spindle out.

FIG. 21 illustrates the construction used in large condensers. The spindle projects through a water-sealed stuffing box on the top of the head. By means of a hand wheel on this spindle the annular water space can be adjusted through prescribed limits, thus making it more efficient at light loads, or when the temperature of injection water varies, due to seasons and etc.

The problem of water supply arrangement, levels, etc., are constantly changing ones, and we would be very glad to furnish detailed information and drawings covering each individual case.

When writing for estimates, please answer the following questions:

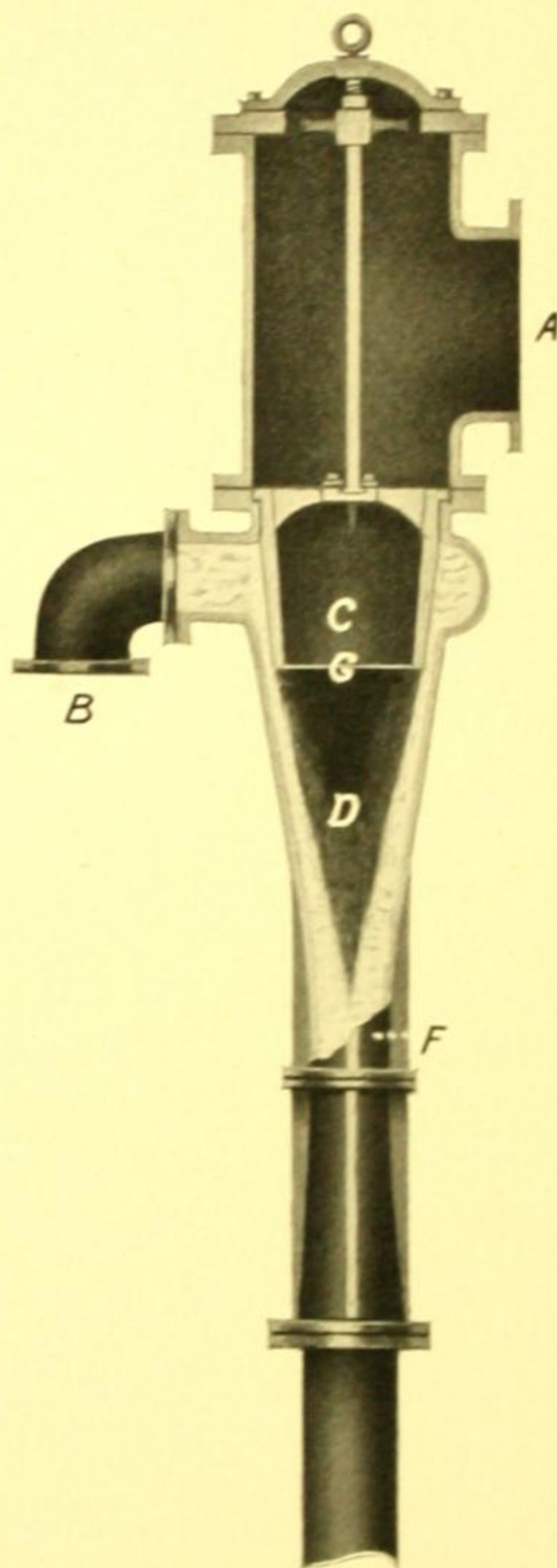
1. Rated load on generating unit.
2. Type of load to be carried, stating maximum and minimum.
3. Size of exhaust opening on generating unit.
4. Type of water supply, and location of same.

5. Level above some datum plane of.
 - (a) engine room floor;
 - (b) water supply;
 - (c) lowest level at which hot well can be drained;
 - (d) maximum temperature of injection water.
6. State whether relief valve is to be placed inside or outside of engine or boiler room.
7. If convenient, send rough sketch, showing location of generating unit, convenient location of pumps, etc.

On account of the fact that the injection water is supplied by a separate pump, entirely independent of the condenser itself, the water supply can be made entirely independent of the vacuum in the condenser. That is, if the vacuum in the condensing chamber should fall off, due to an overload on the system, the water supply would not necessarily be decreased and the vacuum eventually broken. On account of this fact, this condenser is especially efficient where excessive loads and sudden fluctuation of load are frequent, as, for instance, rolling mill, street railway work, etc.



FIG. 22



E
FIG. 23

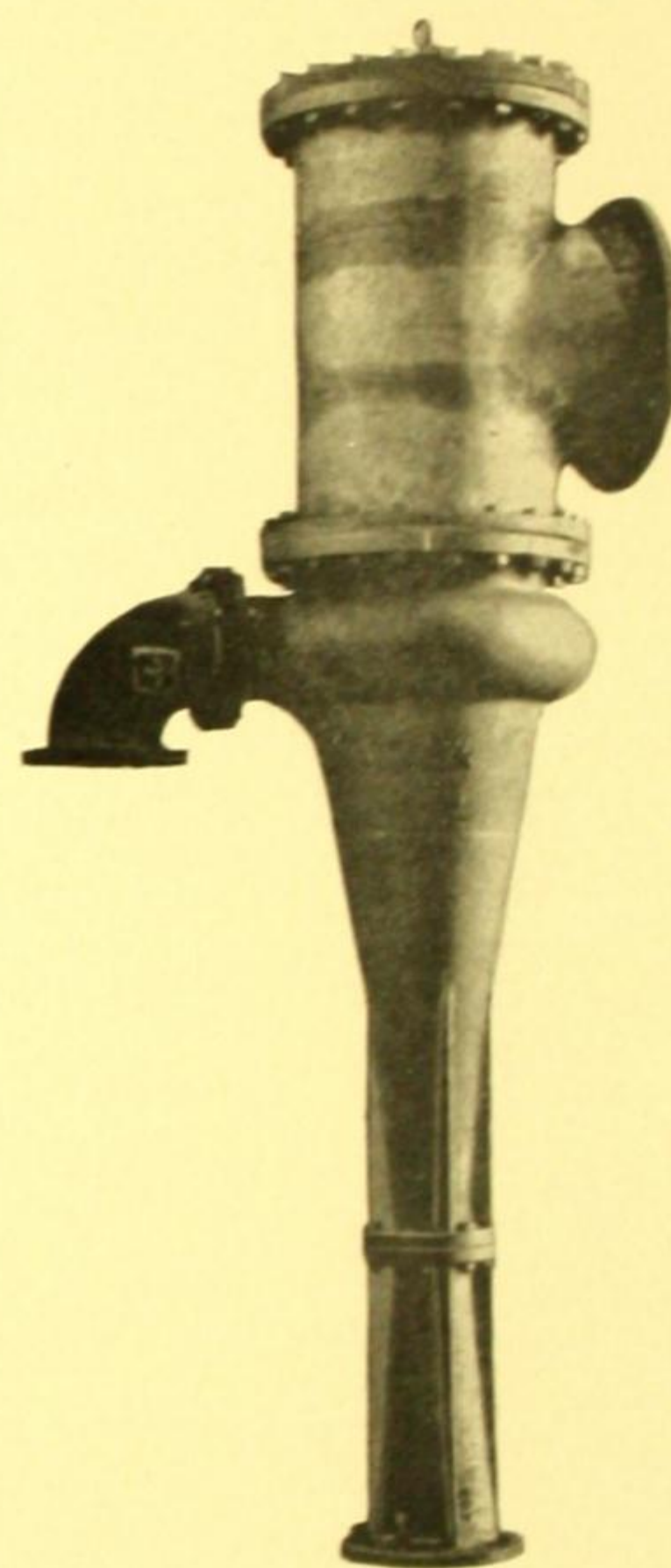


FIG. 24

SIZES AND CAPACITIES OF KELLOGG INJECTOR CONDENSERS.

Size in inches	Steam capacity in lbs. per hour at 26 in. vacuum	Steam capacity in lbs. per hour at 28 in. vacuum	Gals. per minute when condensing steam in columns 2 and 3. Inj. water at 70° F.
8	5000	2500	350
10	8000	4000	500
12	12000	6000	600
14	14000	7000	750
16	16000	8000	1000
18	19000	9500	1250
20	24000	12000	1500
24	32000	16000	2000
30	48000	24000	3000
36	64000	32000	4000
42	96000	48000	6000
48	128000	64000	8000
54	144000	72000	9000
60	192000	96000	12000

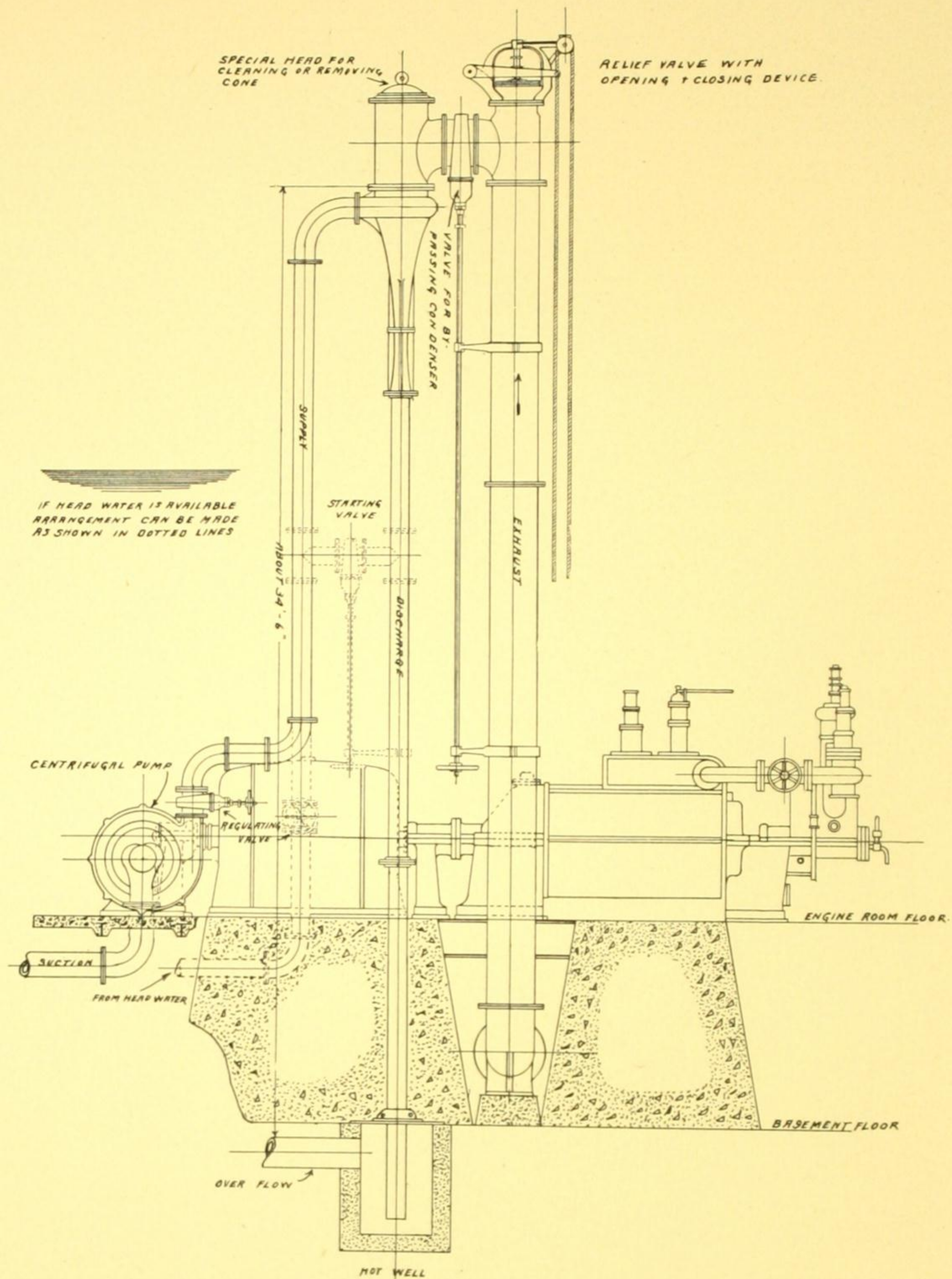


FIG. 25

KELLOGG BAROMETRIC CONDENSER ATTACHED TO PARSONS TURBINE

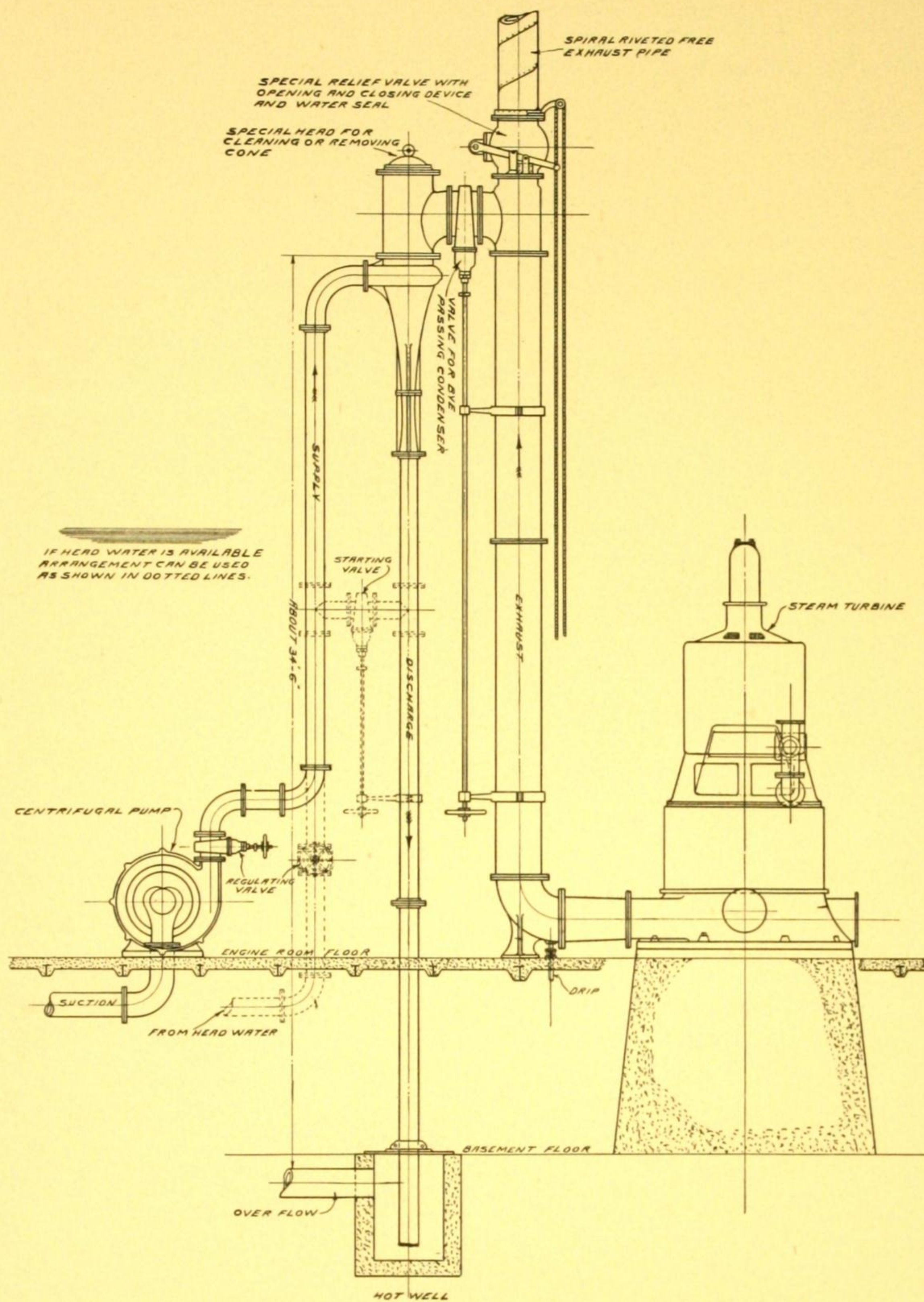


FIG. 26

KELLOGG BAROMETRIC CONDENSER, ATTACHED TO CURTIS TURBINE

EXPANSION JOINTS

To fulfill the large demand for an expansion joint, practical and serviceable in every way, and yet economical in price, we manufacture a joint, as shown in the accompanying sketch, known as the "Bell" type.

The joint is made of copper (properly tempered) in the form of a bell, the ends being rolled over into recesses on the faces of the flanges. These flanges may be either forged steel, cast steel or cast iron. This makes a joint on the end similar to a van stone joint.

The joint can be designed to take up any amount of expansion, but we would suggest that customers do not rely on one joint to take up more than 1 inch of expansion.

They are made in any size up to 60 inches in diameter, and are particularly serviceable in exhaust steam lines. They are very reliable and last longer than almost any other type of expansion joint manufactured.

Prices are net on application.

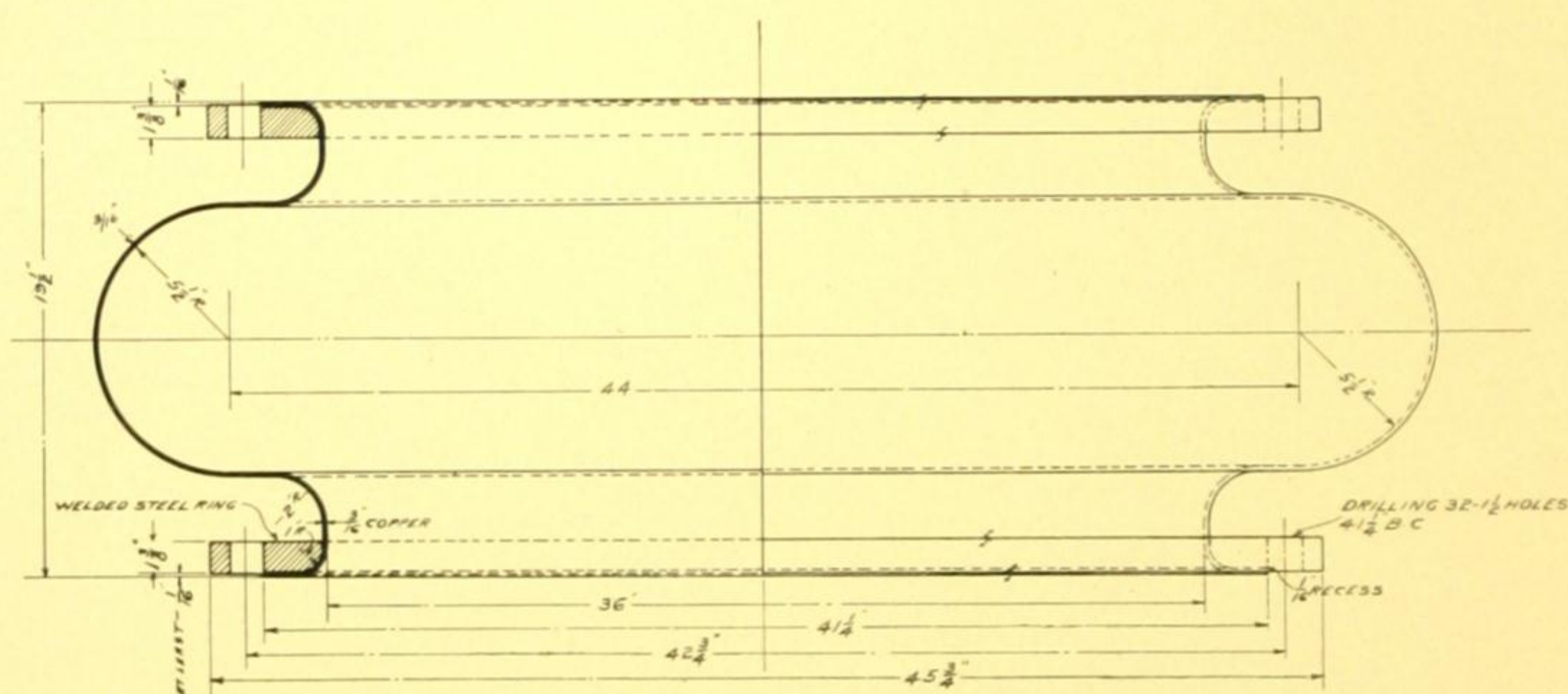


FIG. 27

TYPICAL 36-INCH EXPANSION JOINT

VALVES

A large number of the valves listed on the following pages are carried in stock, and we are prepared to make prompt quotations and quick deliveries on all types of special valves.

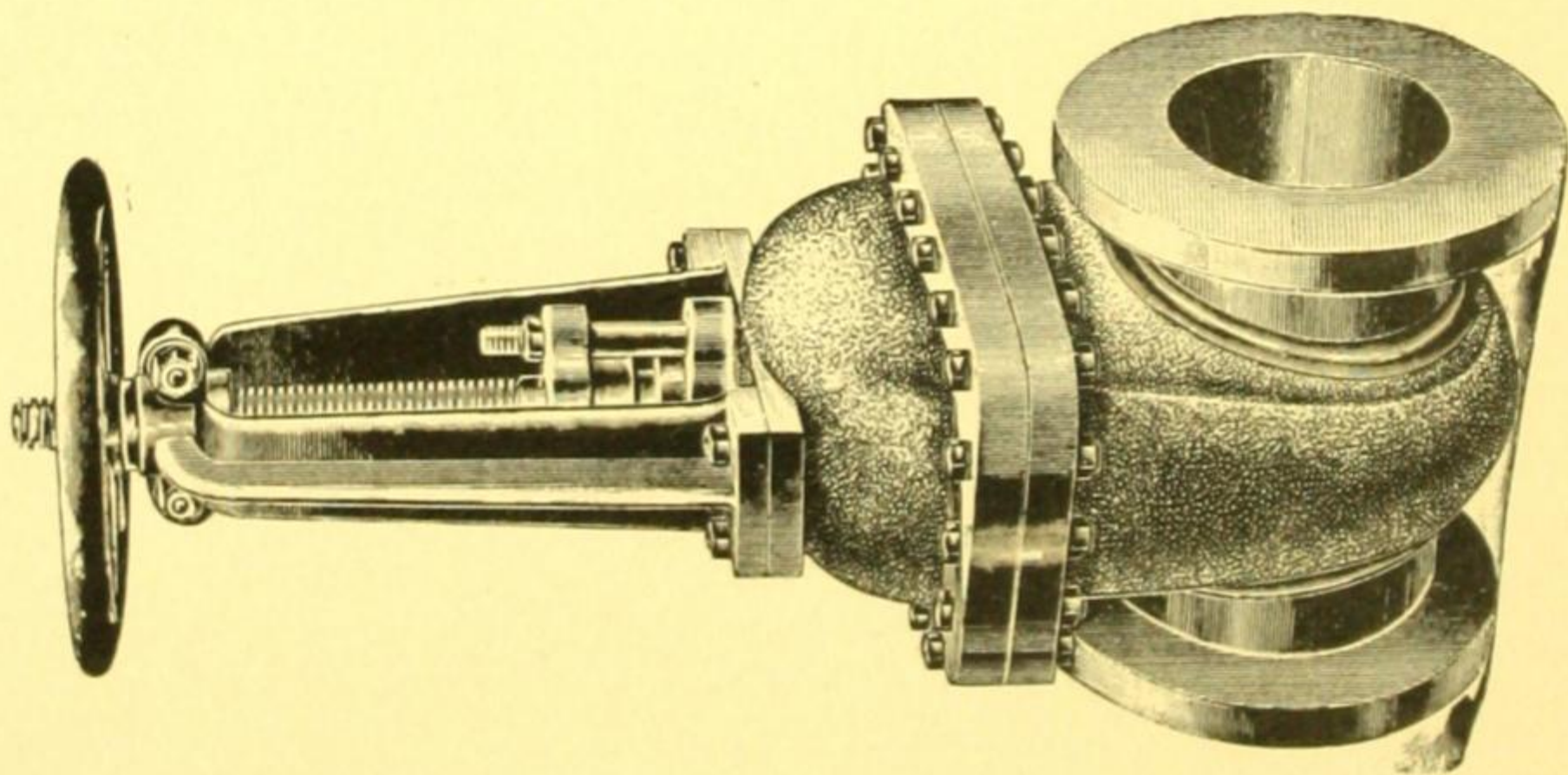


FIG. A.
OUTSIDE SCREW AND YOKE
FOR 300 LBS. PRESSURE

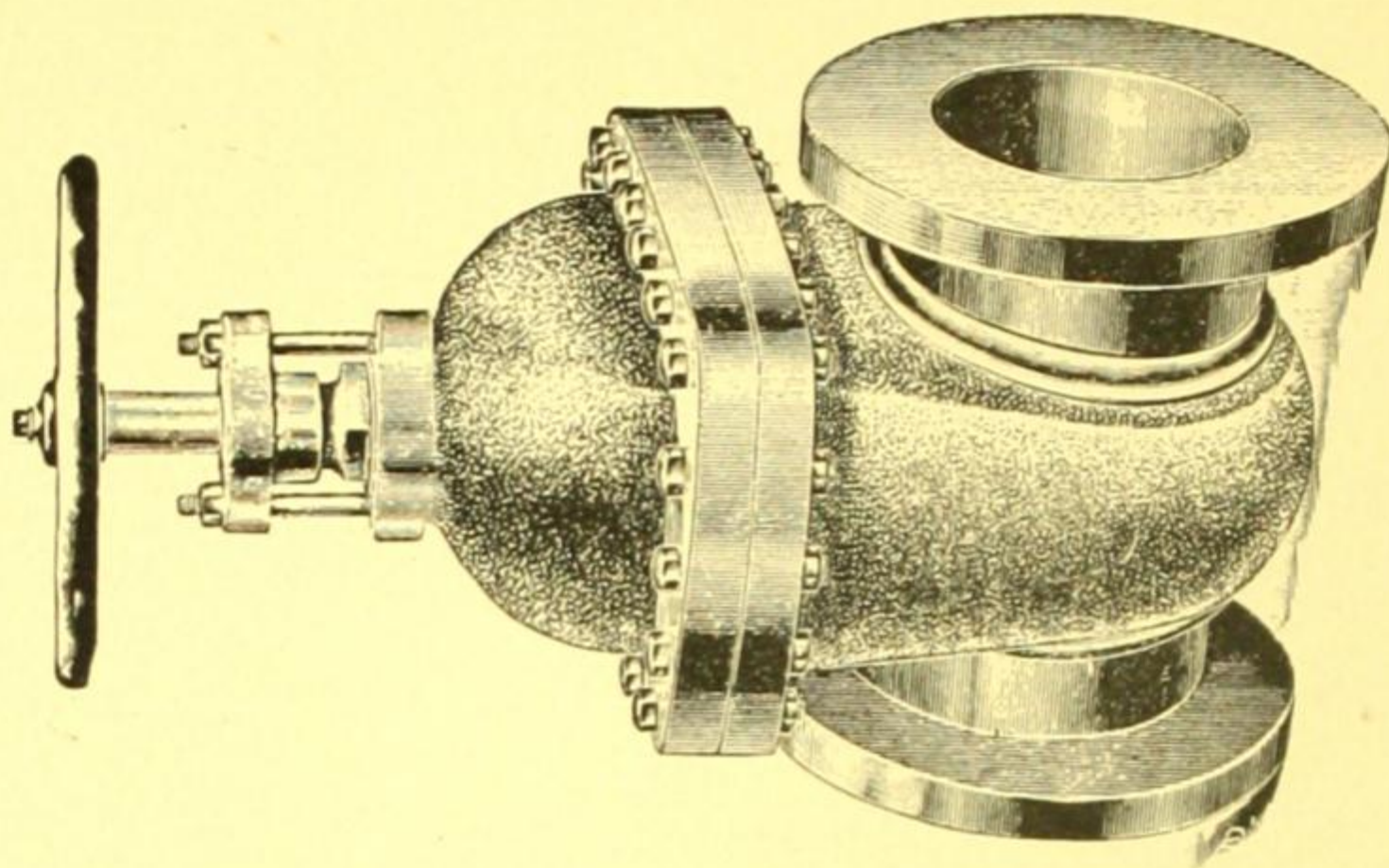


FIG. B
INSIDE SCREW
FOR 150 LBS. PRESSURE

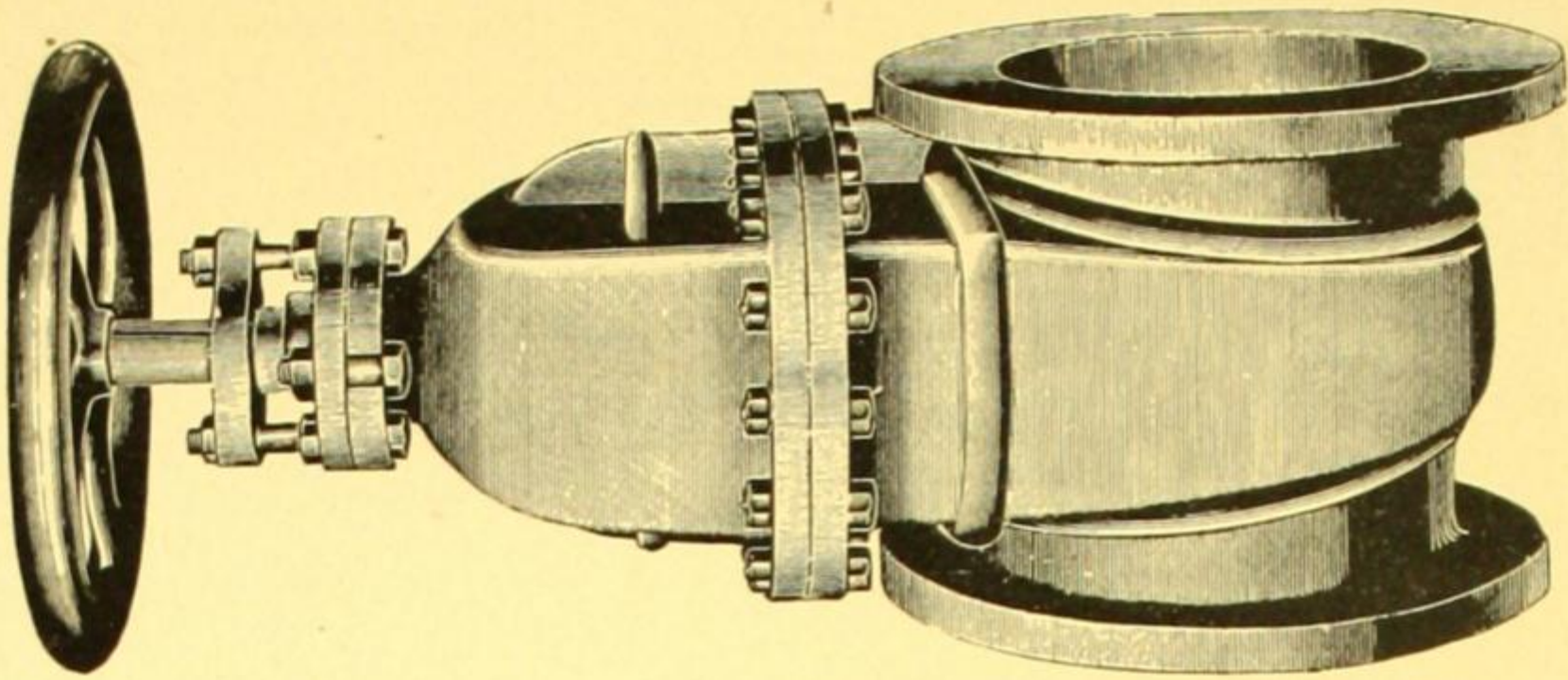


FIG. C
INSIDE SCREW
FOR 100 LBS. PRESSURE

IRON BODY BRONZE MOUNTED GATE VALVES

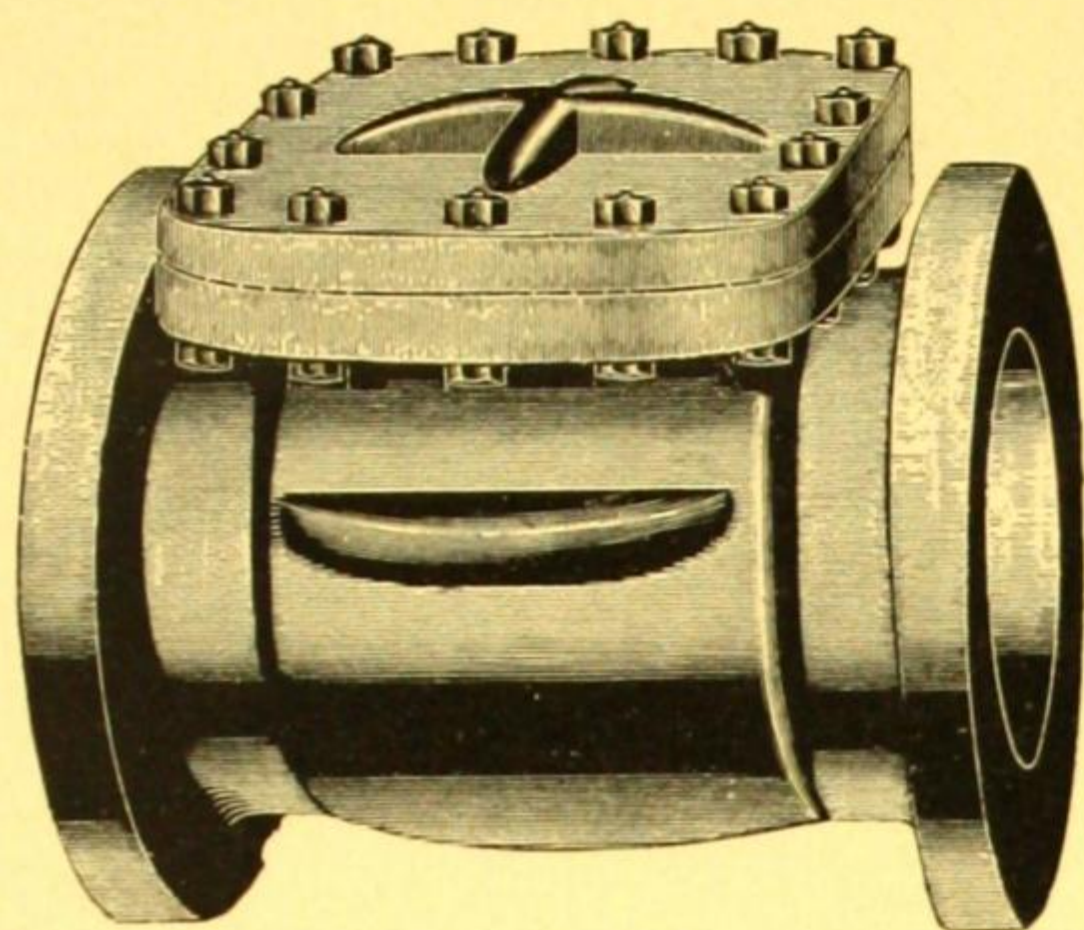


FIG. D SWING CHECK VALVE
FOR 300 LBS. PRESSURE

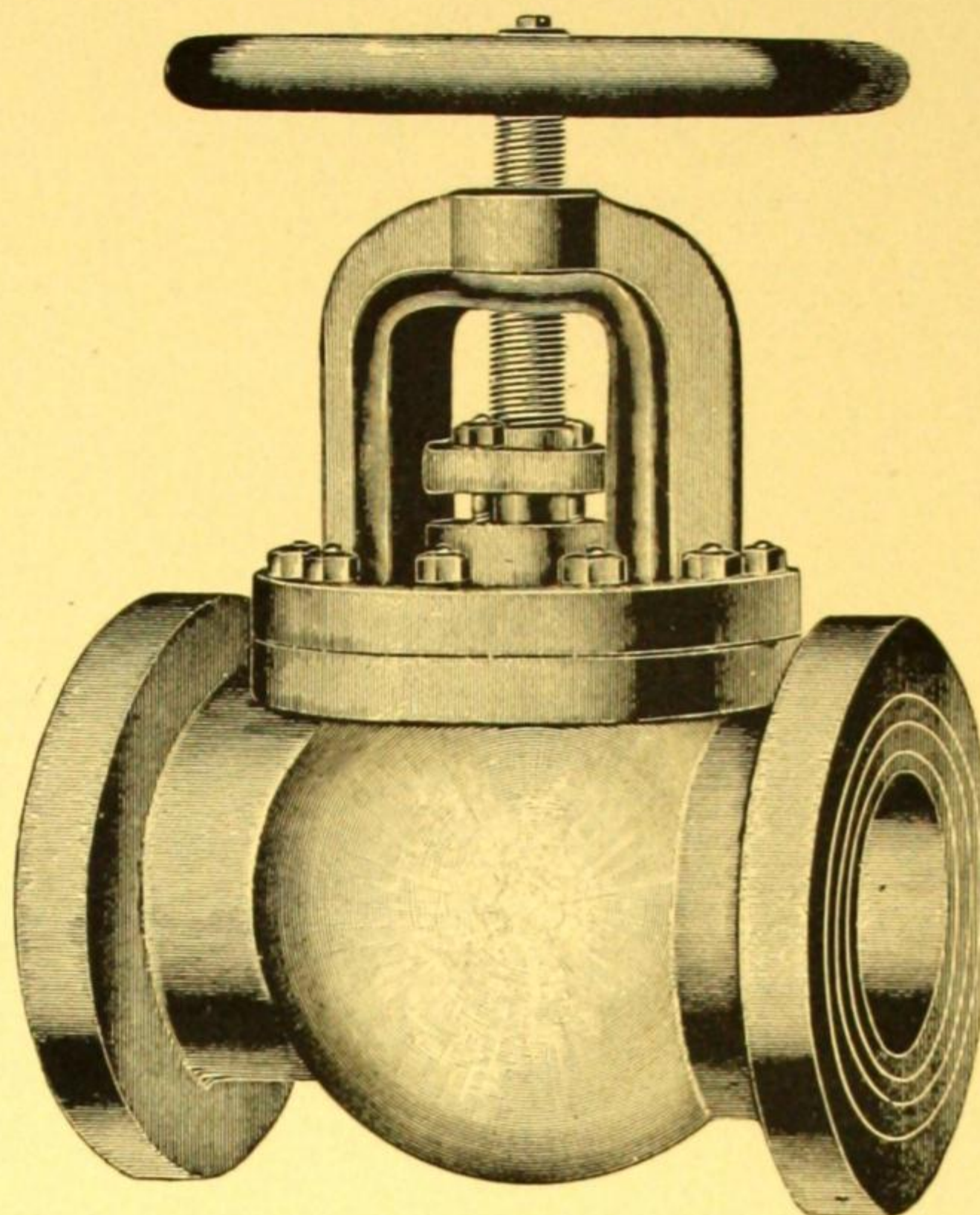


FIG. E GLOBE VALVE
FOR 300 LBS. PRESSURE

IRON BODY—BRONZE MOUNTED

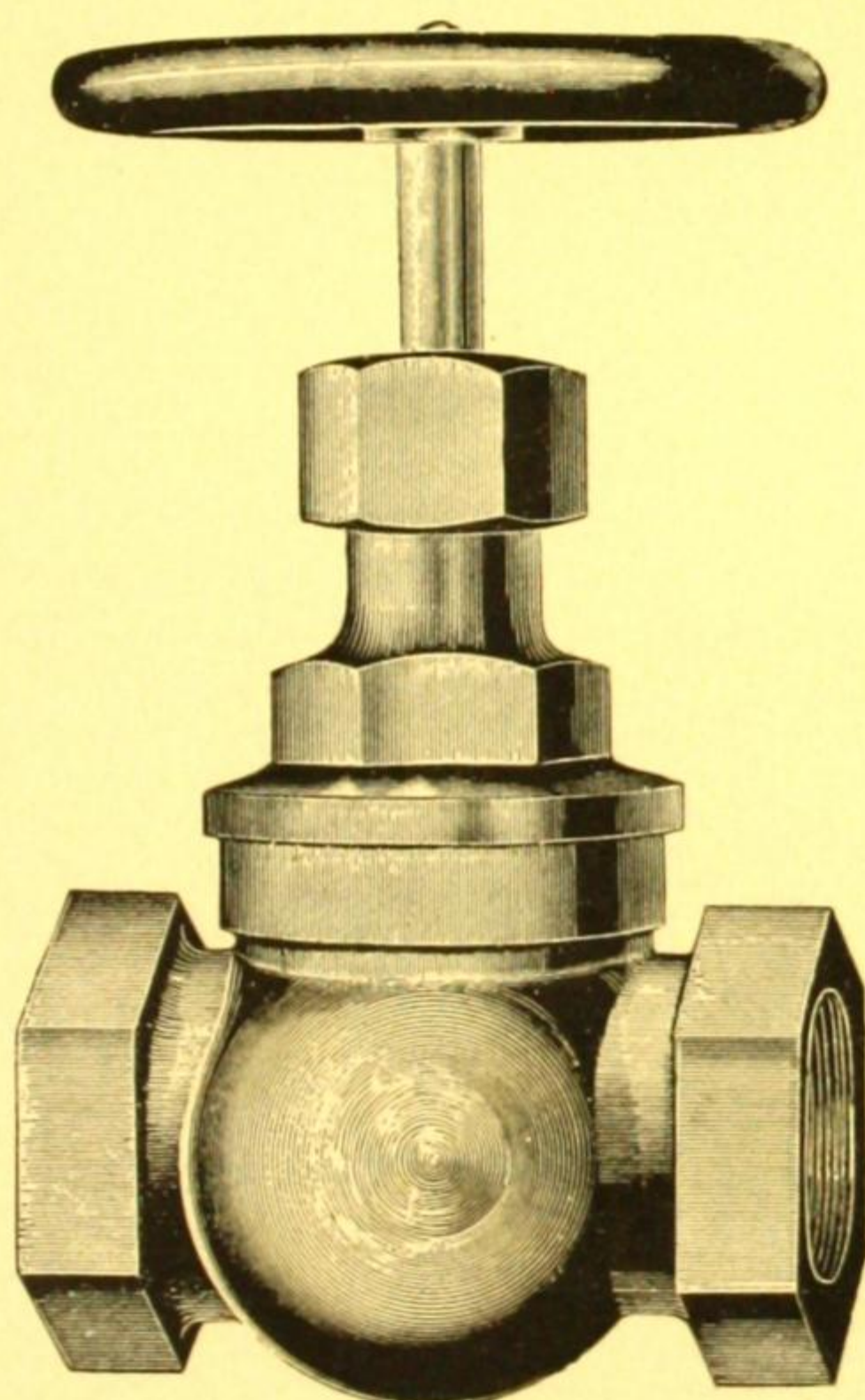


FIG. F GLOBE VALVE
FOR 300 LBS. PRESSURE

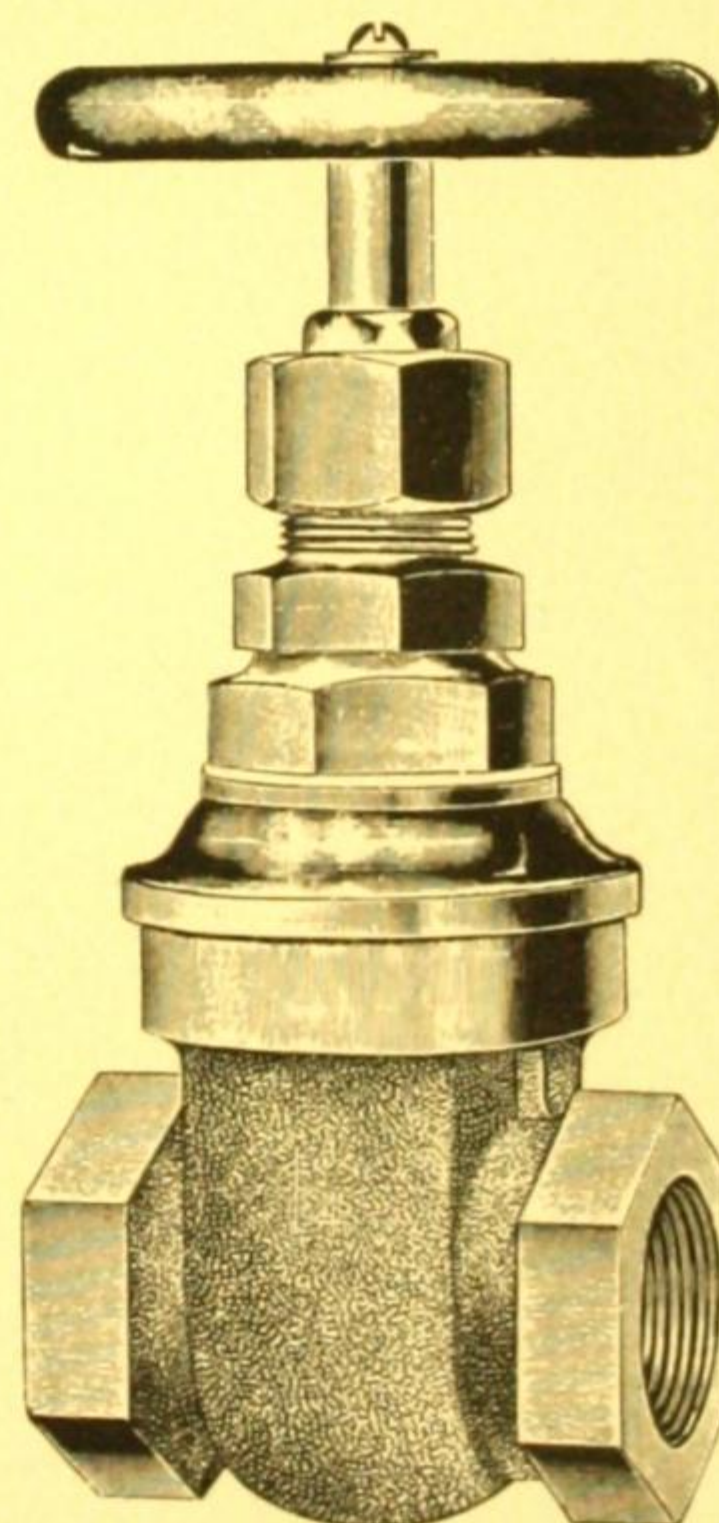


FIG. G GATE VALVE
FOR 300 LBS. PRESSURE

BRONZE BODY

GATE VALVES

IRON BODY BRONZE MOUNTED

EXTRA HEAVY
for 300 lbs.
pressure

MEDIUM
for 150 lbs
pressure

STANDARD
for 100 lbs
pressure

BRONZE
BODY

SIZE.....	2½	3	3½	4	4½	5	6	7	8	9	10	12	14	16	18	20	24	Flgd. End and Secd. End Same List
Fig. A																		
List Outside Screw and Yoke	{	\$45.00	\$50.00	\$60.00	\$65.00	\$75.00	\$85.00	\$105.00	\$125.00	\$150.00	\$200.00	\$250.00	\$350.00	\$450.00	\$600.00	\$800.00	.....	
List Inside Screw	{	35.00	40.00	45.00	50.00	60.00	65.00	80.00	100.00	120.00	160.00	200.00	300.00	400.00	.....	.....	.....	
F. to F. both O. S. & Y. and I. S.	{	9¾	10¼	11	11½	12½	13⅝	15¾	16½	17¾	18½	19	21⅝	22¾	24¼	26	.....	
List Outside Screw and Yoke	{	31.00	35.00	41.00	43.00	53.00	66.00	80.00	97.00	122.00	155.00	190.00	250.00	350.00	450.00	.....	.....	
Fig. B List Inside Screw	{	23.00	27.00	31.00	35.00	41.00	45.00	55.00	72.00	87.00	120.00	145.00	200.00	300.00	400.00	.....	.....	
F. to F.....		7⅞	8⅛	9⅝	9⅞	10½	11	12	13½	15	16	16½	17¼	18½	20	.....	.....	
List Outside Screw and Yoke	{	20.00	23.00	28.00	33.00	40.00	46.00	55.00	70.00	90.00	115.00	135.00	170.00	240.00	350.00	475.00	550.00	
Fig. C List Inside Screw	{	12.00	15.00	18.00	20.00	23.00	25.00	30.00	45.00	55.00	80.00	90.00	125.00	190.00	275.00	375.00	425.00	{ 6 in. and under made with pack- ing nut instead of gland
F. to F.		6¾	7⅜	8⅛	9	9⅝	9½	11	11½	12¼	13	13¾	14¾	17¾	19½	20	21	
SIZE.....		¾	⅜	½	¾	1	1¼	1½	2	2½	3							{ Secd. End only
Extra Heavy List. Fig. G..				\$3.75	\$4.25	\$5.50	\$7.75	\$10.00	\$15.00	\$27.50	\$38.50							
Medium and Standard List...		1.25	1.25	1.30	1.75	2.50	3.50	5.00	7.50	14.00	20.00							

GLOBE AND ANGLE VALVES

BRONZE MOUNTED

SIZE.....	2	2½	3	3½	4	4½	5	6	7	8	10	12
List Flgd.....		\$35.00	\$40.00	.....	\$50.00	.....	\$65.00	\$80.00	\$100.00	\$120.00	\$200.00	\$300.00
List Scd.		33.00	37.00	.....	46.00	.....	61.00	75.00	95.00	114.00	190.00	.....
Globe F. to F. Fig. E.....		11	12	.....	13½	.....	15¼	17	18	20	23	25
Angle C. to F. Flgd.....		5½	6⅛	.....	6¾	.....	7⅝	8½	9	9½	11	12½

EXTRA
HEAVY

IRON BODY

List Flgd.....	8.50	14.00	18.50	21.50	26.00	34.00	42.00	50.00	80.00	90.00	130.00	185.00
List Scd.	7.25	12.00	16.75	19.50	24.00	32.00	40.00	48.00	80.00	90.00	130.00	185.00
Globe F. to F.	6½	8½	10½	10¾	11¼	12¾	12¾	15¾	17¼	19	21¼	24½
Angle C. to F. Flgd.		4¾	4¾	5⅝	5¾	6⅝	6½	7⅞	8¼	9	10¾	12¾

MEDIUM AND
STANDARD

Same list for
Globe and
Angle valves.

BRASS BODY

SIZE.....	¼	⅜	½	¾	1	1¼	1½	2	2½	3
List Flgd.....		.....	.....	\$12.00	\$15.00	\$18.00	\$24.00	\$30.00	\$50.00	.....
List Scd. Fig. F.....		.....	\$3.75	4.25	5.50	7.75	10.00	15.00	27.50	.....

EXTRA
HEAVY

MEDIUM AND
STANDARD

List	\$1.10	\$1.25	1.60	2.20	2.80	4.00	5.50	8.75	15.75	22.00	Screwed Ends only
------------	--------	--------	------	------	------	------	------	------	-------	-------	-------------------

CHECK VALVES

IRON BODY		SIZE.....	2½	3	3½	4	5	6	7	8	10
EXTRA HEAVY Fig. D	List Flgd.....	\$35.00	\$40.00	.....	.....	\$50.00	\$65.00	\$80.00	.....	.....	.....
	List Scd.....	33.00	37.00	.....	.....	46.00	61.00	75.00	.....	.....	.....
	F. to F. Flgd....	10⅜	11¾	.....	.....	13¼	14½	17½	.....	.....	.....
MEDIUM AND STANDARD		List Flgd.....	17.00	21.00	27.00	30.00	42.00	52.00	67.00	80.00	135.00
		List Scd.....	15.00	18.00	24.00	27.00	38.00	48.00	62.00	75.00	125.00
		F. to F. Flgd....	9½	10	11	11½	12¾	14½	15¼	16¾	18⅞

BRONZE BODY		SIZE.....	½	¾	1	1¼	1½	2	2½	3
EXTRA HEAVY	List Flgd.....	.....	.....	.....	\$12.00	\$15.00	\$18.00	\$27.00	\$45.00	.....
	List Scd.....	\$3.25	\$3.25	\$3.25	4.25	6.00	7.50	12.00	.....	.....
	List.....	1.50	1.75	2.25	3.25	4.25	6.25	12.00	20.00	
MEDIUM AND STANDARD		List.....	1.50	1.75	2.25	3.25	4.25	6.25	12.00	20.00

ERECTING CREWS

The most important matter to be considered when a piping system of any description is under consideration, is the quality of the men who are to erect the work, as men who are accustomed to handle high pressure work know instinctively a great many of the requirements and their experience leads them to overcome difficulties that less experienced men could not overcome.

We have well-equipped erecting crews, and many of our foremen and superintendents have been in our employ for ten years at the time of printing this catalog, and have had an extensive experience in this type of work.

We also have a large quantity of specially designed tools for erecting this class of work, also many sets of threading machines and engines, which we transport to jobs where advisable.

We have furnished material and erected it in such plants as:

N. Y. C. & H. R. R. R. CO., Port Morris and Yonkers Stations, N. Y.

ARBUCKLE SUGAR REFINING CO., Brooklyn, N. Y.

WASHINGTON WATER POWER CO., Spokane, Wash.

MICHELIN TIRE CO., Milltown, N. J.

HUDSON TUNNEL CO.'S POWER STATION, Jersey City, N. J.

NORFOLK & PORTSMOUTH TRACTION CO., Norfolk, Va.

UNION GAS & ELECTRIC CO., Cincinnati, Ohio.

(The above two plants under Sargent & Lundy, Engineers.)

ARCTIC HYGEIA ICE CO, New York.

H. A. ROWE KNITTING CO., Huntsville, Ala.

LIGHTING PLANT AT NASSAU, Bahama Islands.

and many other plants we might mention.

We have also furnished material for such plants as

NEW YORK EDISON CO., Duane Street, Old and New Waterside Stations, etc.

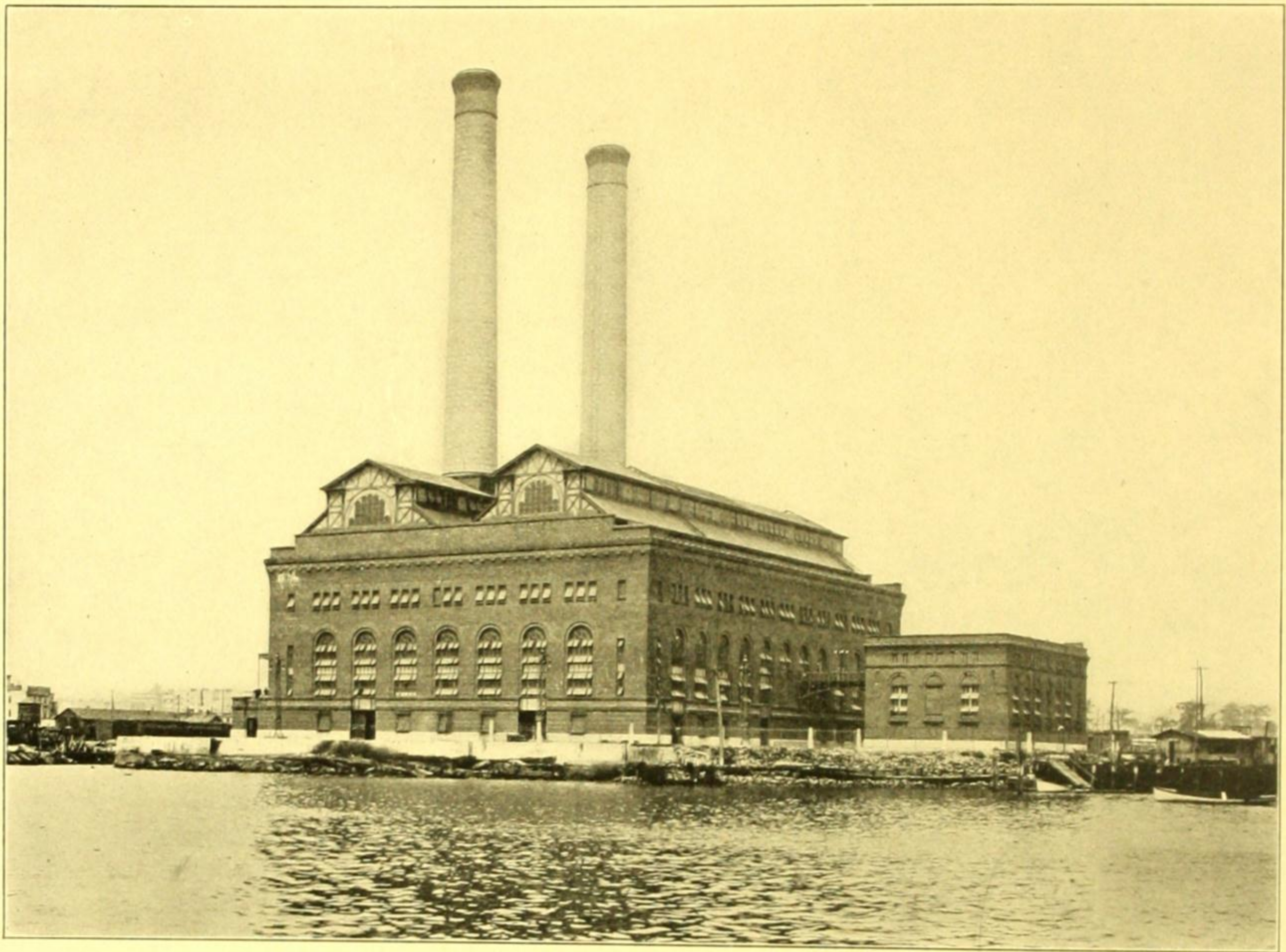
INTERBOROUGH RAPID TRANSIT CO., 59th Street Power Station.

MANHATTAN ELEVATED POWER STATION, 76th Street, New York.

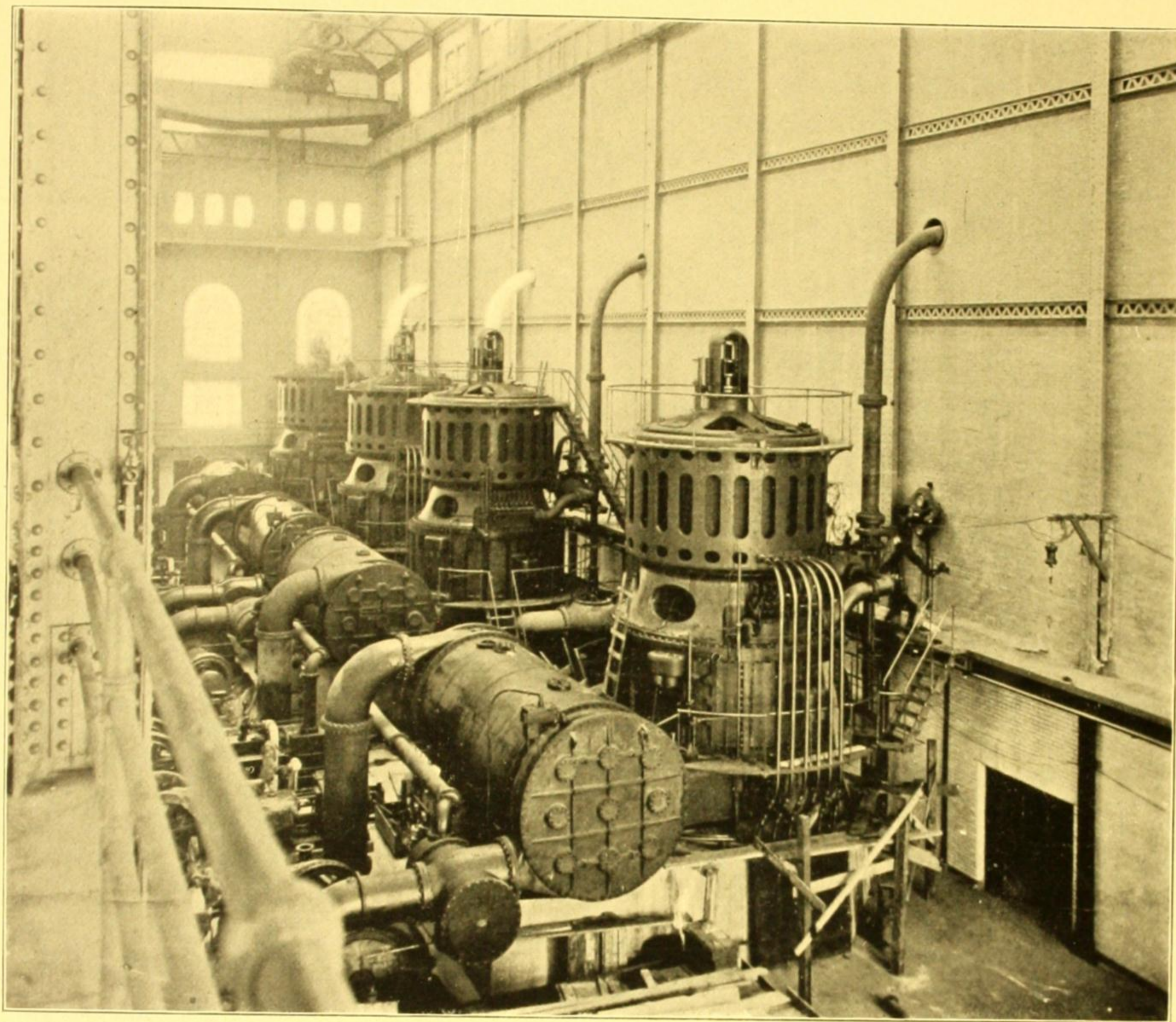
PORTLAND GENERAL ELECTRIC CO., Portland, Oregon.

LIGHTING PLANT AT MANILA, Philippine Islands.

and many others we might mention.



NEW YORK CENTRAL AND HUDSON RIVER RAILROAD POWER STATION, EXTERIOR



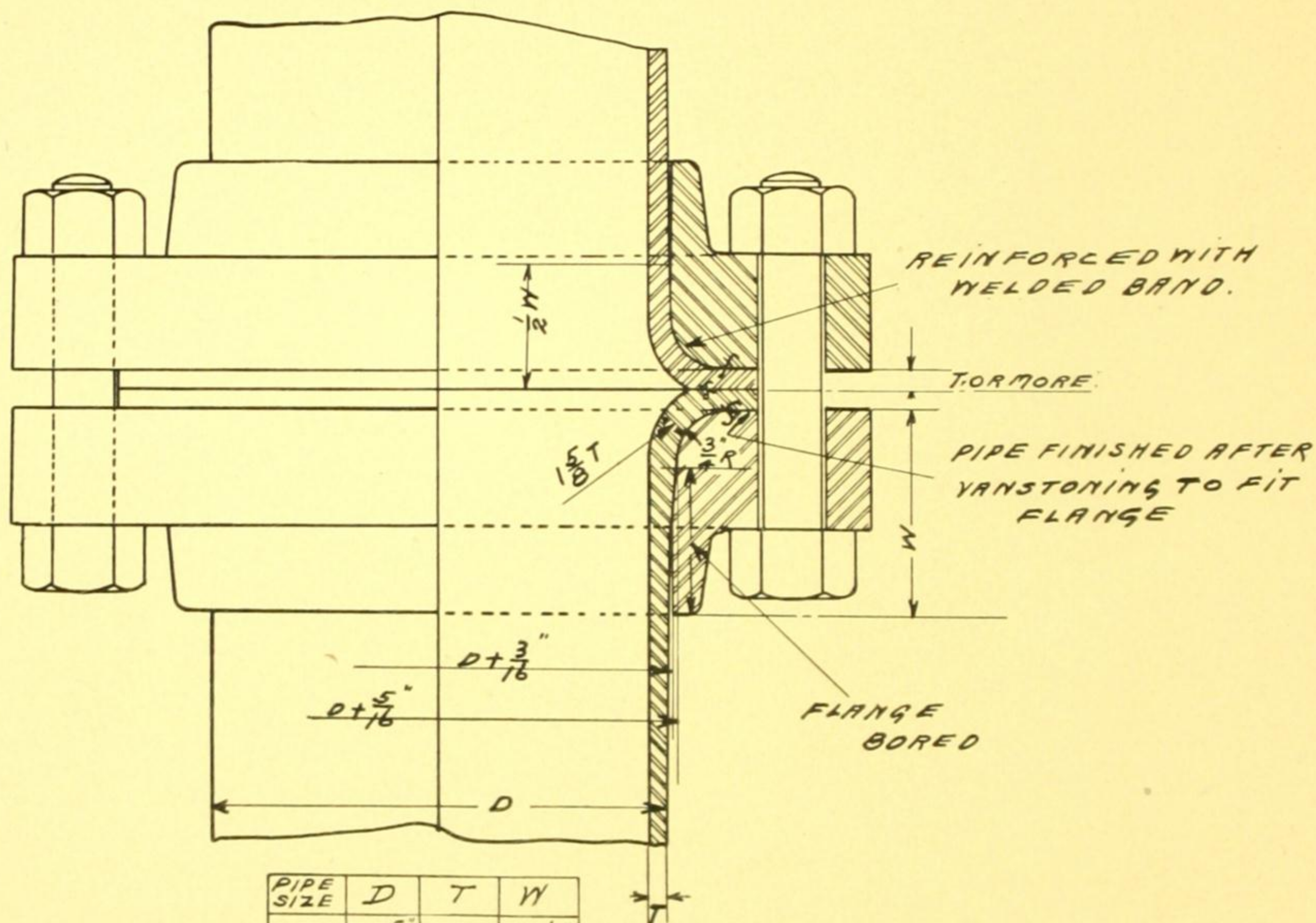
NEW YORK CENTRAL AND HUDSON RIVER RAILROAD POWER STATION, INTERIOR OF
TURBINE ROOM

IMPROVED VAN STONE JOINTS

What is known as the van stone, climax or rolled joint has been manufactured for years, and the fundamental points of same are very good and well taken. However, up to a few years ago it was not manufactured properly to insure a lasting and tight joint, for the reason that the metal in the pipe was rolled over the face of the flange without any increased thickness. This resulted in a very thin piece of metal in the rolled-over portion of the pipe; in fact, so thin that after it was faced on the front, which some years ago was all that was done in an average piece of pipe, the metal would not be more than between 1-8-inch and 3-16-inch in thickness.

It is just as necessary to face the turned-over portion of the pipe on the back to insure a tight joint as it is on the front, for the reason that to make this joint properly it is necessary to heat the pipe. This forms a scale, and there is very seldom a joint made that, after the pipe is rolled over, has not more or less scale on the inside of the turned-over portion, which scale, when the pipe cools off, and the first time it is either dropped or hammered, falls off. This leaves a recess between the pipe and the flange, which allows the turned-over portion of the pipe to settle unevenly against the flange, consequently injuring the work for a lasting tight joint.

To overcome this imperfection, we reinforce the pipe in the beginning, by welding on a wedge-shaped band, doubling the thickness of the pipe at the end. This allows us to face the pipe

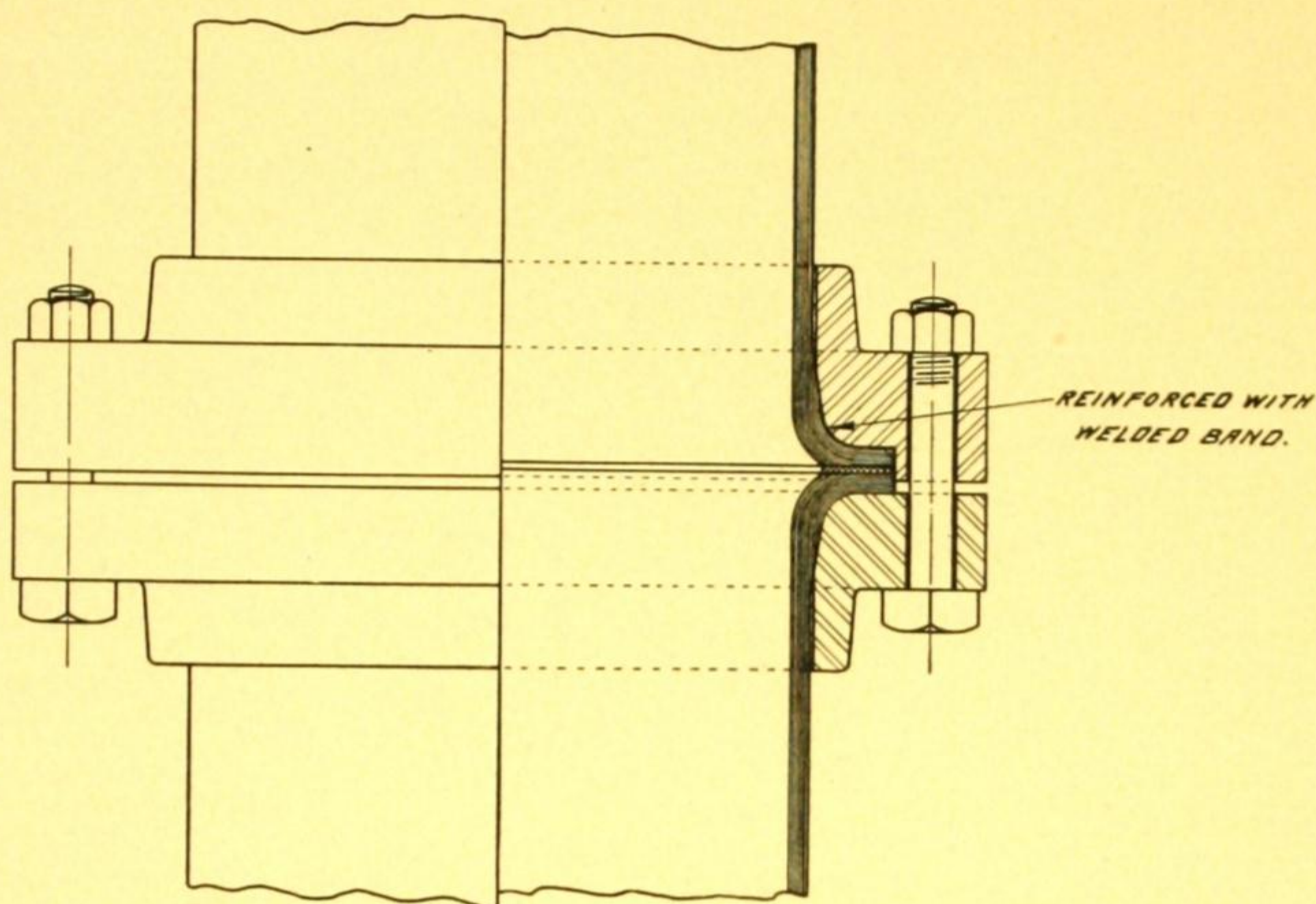


KELLOGG IMPROVED VAN STONE JOINT

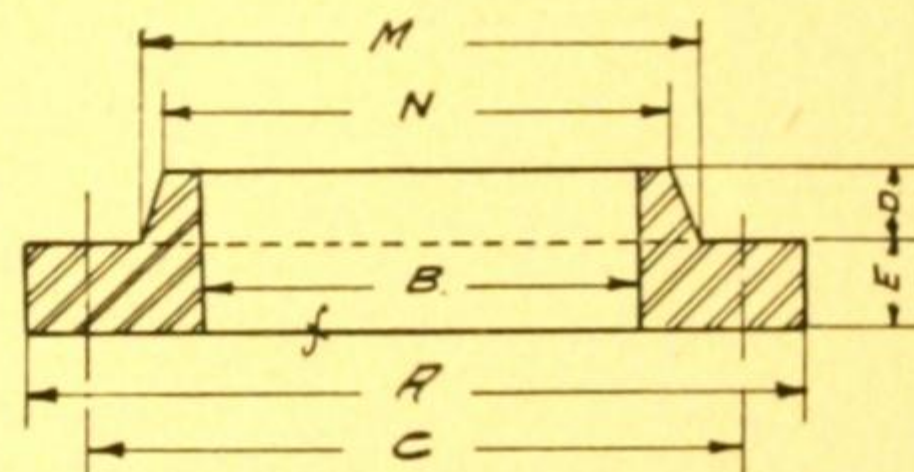
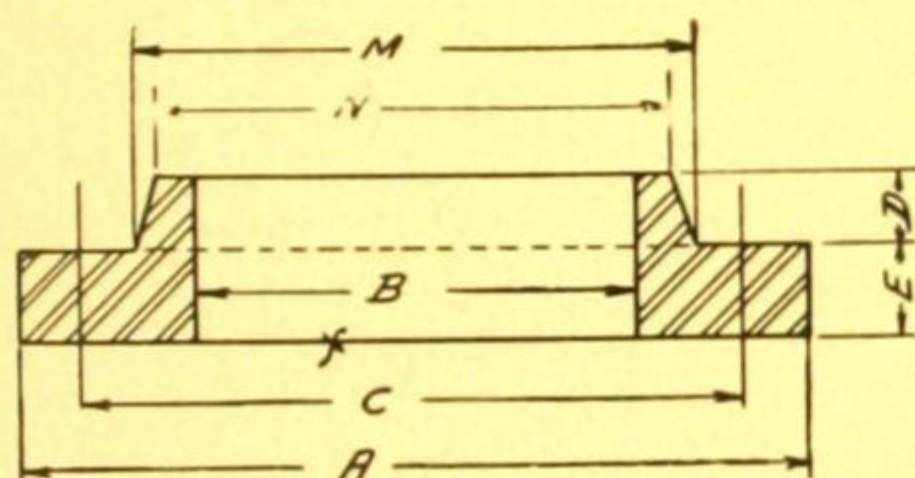
on the front, back, and outer circumference after rolling over, leaving a thickness equal to the original thickness of the pipe, and leaving a thickness of $1\frac{5}{8}$ times the original thickness of the pipe through the fillet, which insures a true bearing after the pipe is made up, beside greatly increased strength. The joint, as above made, has given wonderful satisfaction in a great many large pieces of work.

The method above mentioned of welding on a band to get the increased thickness is better than either upsetting or turning the pipe over on itself, for the reason that the grain of the metal in our method is injured less than in any other method used. It is a well-known fact that excessive upsetting crystallizes and weakens the fiber of the metal.

We strongly recommend, unless otherwise specified, in van stone joint work of any description, the use of rolled steel flanges, and we give on this and following pages tables showing the detailed dimensions of flanges used by us, unless other dimensions are called for.



KELLOGG IMPROVED HYDRAULIC VAN STONE JOINT



SIZE		5"	6"	7"	8"	9"	10"	12"	14"	15"	18"
DIA FLANGE	A	11	12 $\frac{1}{2}$	14	15	16	17 $\frac{1}{2}$	20	22 $\frac{1}{2}$	23 $\frac{1}{2}$	27
INSIDE DIA	B	5 $\frac{3}{4}$	6 $\frac{1}{2}$	7 $\frac{1}{2}$	8 $\frac{1}{2}$	9 $\frac{1}{2}$	10 $\frac{1}{2}$	12 $\frac{1}{2}$	14 $\frac{1}{2}$	15 $\frac{1}{2}$	18 $\frac{1}{2}$
BOLT CIRCLE	C	9 $\frac{1}{4}$	10 $\frac{1}{8}$	11 $\frac{1}{8}$	13	14	15 $\frac{1}{4}$	17 $\frac{1}{4}$	20	21	24 $\frac{1}{2}$
THICKNESS BOSS	D	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$
" FLANGE	E	1 $\frac{3}{8}$	1 $\frac{1}{4}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	2"
DIA	M	7	8 $\frac{1}{8}$	9 $\frac{1}{8}$	10 $\frac{1}{8}$	11 $\frac{1}{8}$	12 $\frac{1}{8}$	14 $\frac{1}{8}$	16 $\frac{1}{8}$	17 $\frac{1}{8}$	21 $\frac{1}{8}$
DIA	N	6 $\frac{3}{4}$	7 $\frac{1}{8}$	9	10 $\frac{1}{8}$	11 $\frac{1}{8}$	12 $\frac{1}{8}$	14 $\frac{1}{8}$	16	17	20
NO BOLTS		8	12	12	12	12	16	16	20	20	24
SIZE BOLTS		$\frac{3}{4}$	$\frac{3}{4}$	$\frac{7}{8}$	$\frac{7}{8}$	$\frac{7}{8}$	$\frac{7}{8}$	$\frac{7}{8}$	1	1	1

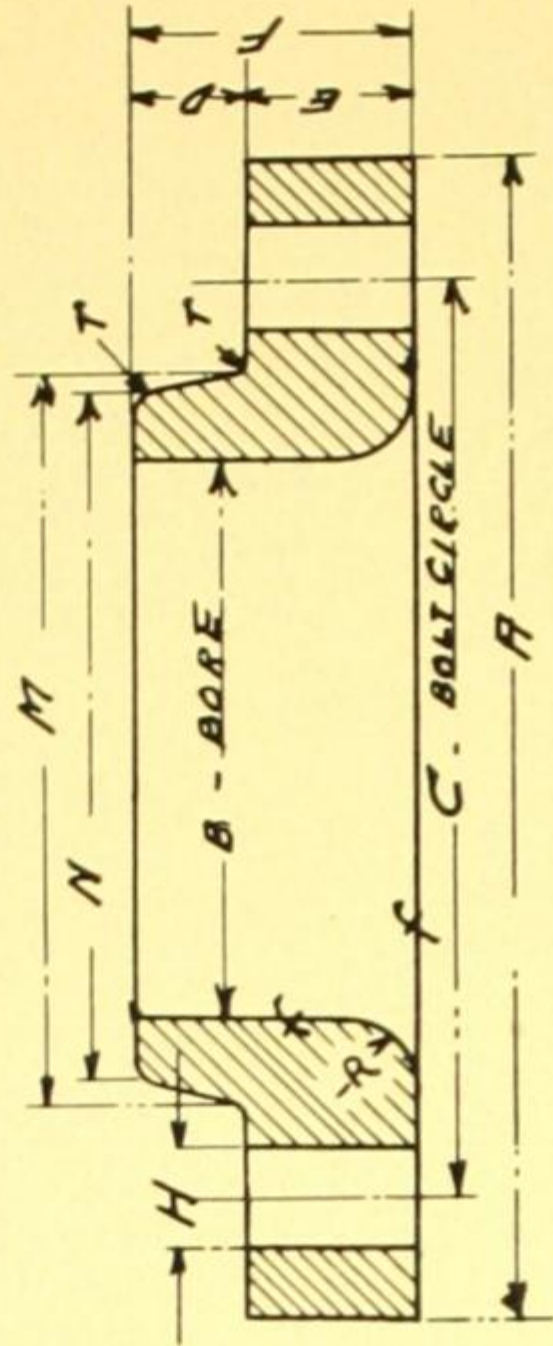
SIZE		5"	6"	7"	8"	9"	10"	12"	14"	15"	16"
DIA FLANGE	A	11	12 $\frac{1}{2}$	14	15	16	17 $\frac{1}{2}$	20	22 $\frac{1}{2}$	23 $\frac{1}{2}$	25
INSIDE DIA	B	5 $\frac{3}{4}$	6 $\frac{1}{2}$	7 $\frac{1}{2}$	8 $\frac{1}{2}$	9 $\frac{1}{2}$	10 $\frac{1}{2}$	12 $\frac{1}{2}$	14 $\frac{1}{2}$	15 $\frac{1}{2}$	18 $\frac{1}{2}$
BOLT CIRCLE	C	9 $\frac{1}{4}$	10 $\frac{1}{8}$	11 $\frac{1}{8}$	13	14	15 $\frac{1}{4}$	17 $\frac{1}{4}$	20	21	24 $\frac{1}{2}$
THICKNESS BOSS	D	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$
THICKNESS FLG	E	1 $\frac{3}{8}$	1 $\frac{1}{4}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	2"	2"	2 $\frac{1}{8}$	2 $\frac{1}{4}$
DIA	M	7	8 $\frac{1}{8}$	9 $\frac{1}{8}$	10 $\frac{1}{8}$	11 $\frac{1}{8}$	12 $\frac{1}{8}$	14 $\frac{1}{8}$	16 $\frac{1}{8}$	17 $\frac{1}{8}$	21 $\frac{1}{8}$
DIA	N	6 $\frac{3}{4}$	7 $\frac{1}{8}$	9	10 $\frac{1}{8}$	11 $\frac{1}{8}$	12 $\frac{1}{8}$	14 $\frac{1}{8}$	16	17	20
NO OF BOLTS		8	12	12	12	12	16	16	20	20	20
SIZE OF BOLTS		$\frac{3}{4}$	$\frac{3}{4}$	$\frac{7}{8}$	$\frac{7}{8}$	$\frac{7}{8}$	$\frac{7}{8}$	$\frac{7}{8}$	$\frac{7}{8}$	1	1

①

SPECIAL EXTRA HEAVY ROLLED STEEL VAN STONE
FLANGE

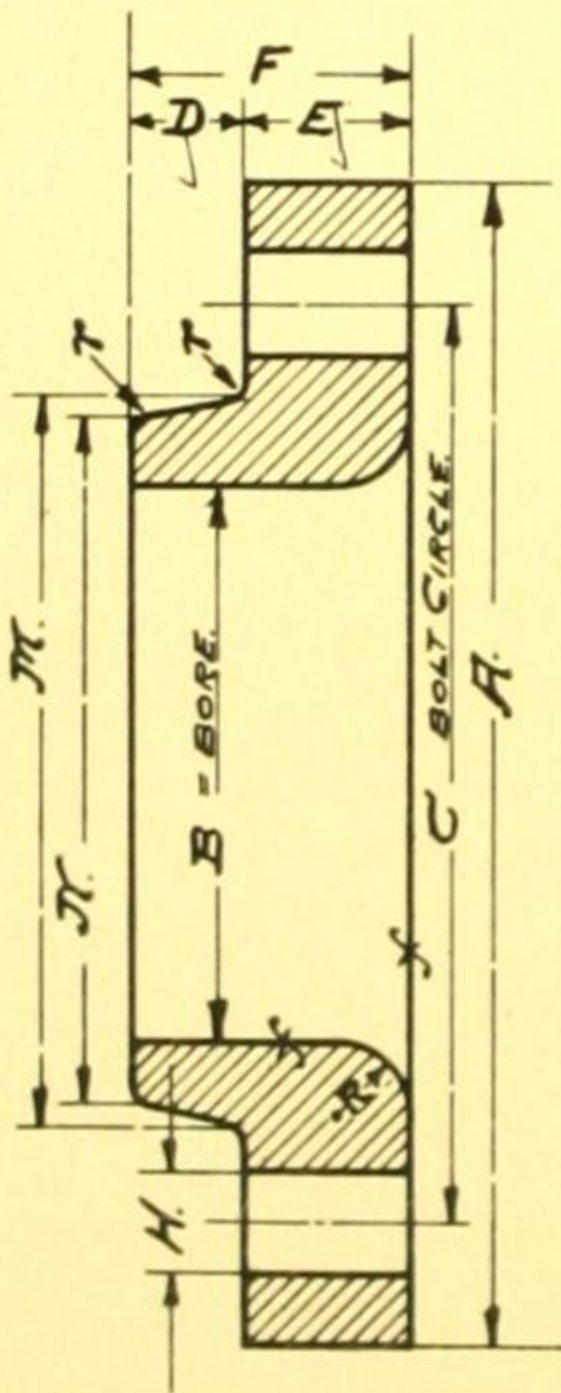
REGULAR EXTRA HEAVY ROLLED STEEL VAN STONE
FLANGE

CAST IRON V. S. FLANGES



PIPE SIZE	A	E	D	F	M	N	B	R	T	NO HOLES	DIA BOLT HOLES	H	C
6	11	1	1 1/2	2 1/2	8 1/2	7 1/2	6 1/2	5 1/2	3 1/2	8	3	9 1/2	
7	12 1/2	1 1/2	1 1/2	2 1/2	9 1/2	8 1/2	7 1/2	5 1/2	3 1/2	8	3	10 1/2	
8	13 1/2	1 1/2	1 1/2	2 1/2	10 1/2	9 1/2	8 1/2	5 1/2	3 1/2	8	3	11 1/2	
9	15	1 1/2	1 1/2	2 3/4	11 1/2	10 1/2	9 1/2	5 1/2	3 1/2	12	3	13 1/2	
10	16	1 3/4	1 1/2	2 3/4	12 1/2	11 1/2	10 1/2	5 1/2	3 1/2	12	3	14 1/2	
12	19	1 5/8	1 1/2	3	14 3/4	14 1/2	12 1/2	5 1/2	3 1/2	12	3	17	
14	21	1 7/8	1 1/2	3 1/2	16 1/2	15 1/2	14 1/2	5 1/2	3 1/2	12	3	18 1/2	
15	22 1/2	1 7/8	1 1/2	3 1/2	17 1/2	16 1/2	15 1/2	5 1/2	3 1/2	16	3	20	
16	23 1/2	1 7/8	1 1/2	3 1/2	18 1/2	17 1/2	16 1/2	5 1/2	3 1/2	16	3	21 1/2	
18	25	1 5/8	1 1/2	3 1/2	20 1/2	20 1/2	18 1/2	5 1/2	3 1/2	16	3	22 1/2	
20	27 1/2	1 3/4	1 1/2	3 1/2	22 1/2	22 1/2	20 1/2	5 1/2	3 1/2	20	3	25	
22	29 1/2	1 3/4	1 1/2	4 1/2	24 1/2	24 1/2	22 1/2	5 1/2	3 1/2	20	3	27 1/2	
24	31 1/2	1 3/4	1 1/2	4 1/2	26 1/2	26 1/2	24 1/2	5 1/2	3 1/2	20	3	29 1/2	

STANDARD CAST IRON VAN STONE FLANGE



PIPE SIZE	A	E	D	F	M	N	B	R	T	NO HOLES	DIA. BOLT HOLES	H	C
-----------	---	---	---	---	---	---	---	---	---	----------	-----------------	---	---

5	11	1 1/2	5/8	2 1/2	7 1/2	7 1/2	5 1/2	3 1/2	3 1/2	8	3	9 1/2
6	12 1/2	1 1/2	5/8	2 1/2	8 1/2	8 1/2	6 1/2	3 1/2	3 1/2	12	3	10 1/2
7	14	1 1/2	5/8	2 1/2	9 1/2	9 1/2	7 1/2	3 1/2	3 1/2	12	3	11 1/2
8	15	1 1/2	5/8	2 1/2	10 1/2	10 1/2	8 1/2	3 1/2	3 1/2	12	3	13
9	16	1 1/2	5/8	2 1/2	11 1/2	11 1/2	9 1/2	3 1/2	3 1/2	12	3	14
10	17 1/2	2	5/8	2 1/2	12 1/2	12 1/2	10 1/2	3 1/2	3 1/2	16	3	15 1/2
12	20	2 1/2	5/8	3	15 1/2	15 1/2	13 1/2	3 1/2	3 1/2	16	3	17 1/2
14	22 1/2	2 1/2	1	3 1/2	16 1/2	16 1/2	14 1/2	3 1/2	3 1/2	20	3	20
15	23 1/2	2 1/2	1 1/8	3 1/2	17 1/2	17 1/2	15 1/2	3 1/2	3 1/2	20	3	21
16	25	2 1/2	1 1/8	3 1/2	18 1/2	18 1/2	16 1/2	3 1/2	3 1/2	20	3	22 1/2
18	27	2 1/2	1 1/8	3 1/2	20 1/2	20 1/2	18 1/2	3 1/2	3 1/2	24	3	24 1/2
20	29 1/2	2 1/2	1 1/8	4 1/2	22 1/2	22 1/2	20 1/2	3 1/2	3 1/2	24	3	26 1/2
22	31 1/2	2 1/2	1 1/8	4 1/2	24 1/2	24 1/2	22 1/2	3 1/2	3 1/2	28	3	28 1/2
24	34	2 1/2	1 1/8	4 1/2	26 1/2	26 1/2	24 1/2	3 1/2	3 1/2	28	3	31 1/2

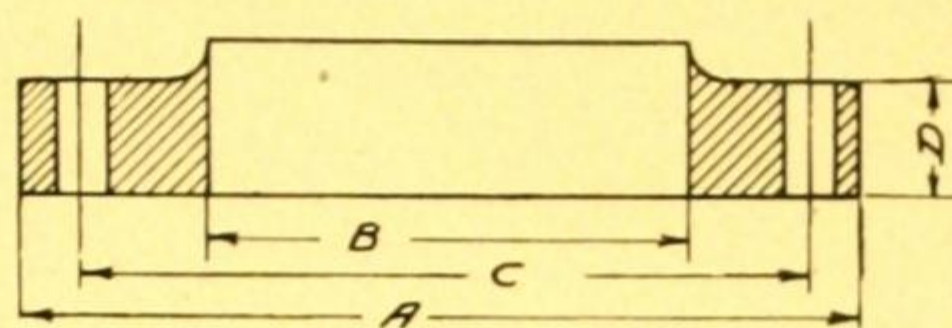
E. H. CAST IRON VAN STONE FLANGE

WELDED FLANGES

It is undoubtedly a fact, at least theoretically, that the best type of a piece of pipe that can be obtained is one solid piece of open hearth steel with rolled steel flanges, all welded together.

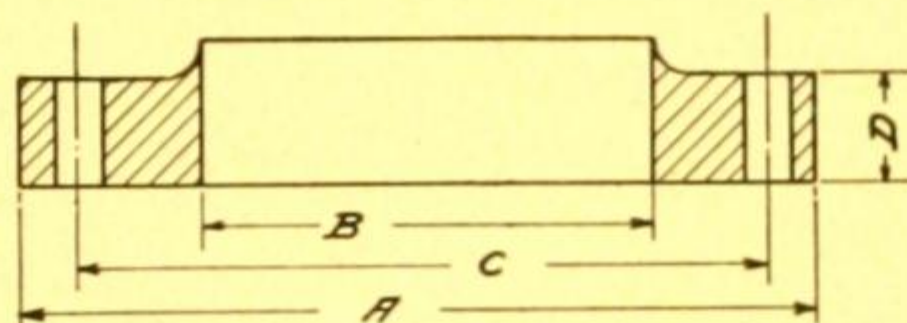
We produce a large quantity of this material. The pipe and the flanges used are both manufactured of very low carbon steel, to insure a perfect weld.

Following in this catalog you will note details of the dimensions of flanges used for welding on pipe.



SIZE		2	2½	3	3½	4	4½	5	6	7	8	9	10	12	14	15
DIA FLANGE	A	6½	7½	8½	9	10	10½	11	12½	14	15	16	17½	20	22½	23½
INSIDE DIA	B	2½	2¾	3¾	3¾	4¾	4¾	5¾	6¾	7¾	8¾	9¾	10¾	12¾	13¾	14¾
THICKNESS FLG.	D	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	2½	2½	2½
BOLT CIRCLE	C	5	5½	6½	7½	7½	8½	9½	10½	11½	13	14	15½	17½	20	21
NO BOLTS		4	4	8	8	8	8	8	12	12	12	12	16	16	20	20
DIA HOLES		¾	¾	¾	¾	¾	¾	¾	¾	1	1	1	1	1	1	1½

SPECIAL EXTRA HEAVY ROLLED STEEL WELDING FLANGE

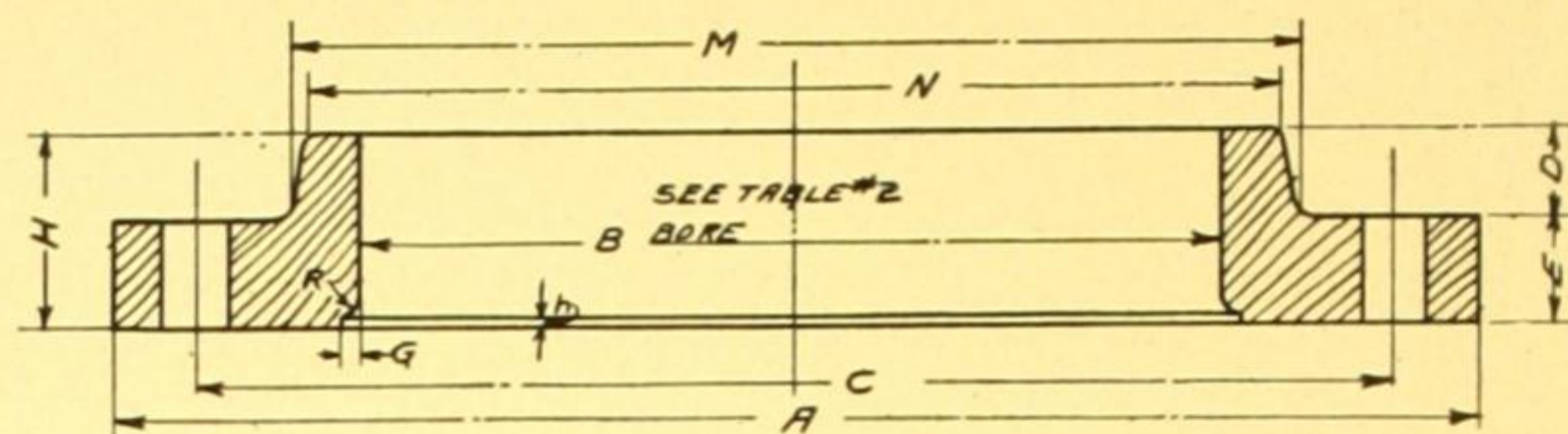


SIZE		2	2½	3	3½	4	4½	5	6	7	8	9	10	12	14	15
DIA FLANGE	A	6½	7½	8½	9	10	10½	11	12½	14	15	16	17½	20	22½	23½
INSIDE DIA	B	2½	2¾	3¾	3¾	4¾	4¾	5¾	6¾	7¾	8¾	9¾	10¾	12¾	13¾	14¾
THICKNESS	D	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	2½	2½	2½
BOLT CIRCLE	C	5	5½	6½	7½	7½	8½	9½	10½	11½	13	14	15½	17½	20	21
NO HOLES		4	4	8	8	8	8	8	12	12	12	12	16	16	20	20
DIA HOLES		¾	¾	¾	¾	¾	¾	¾	¾	1	1	1	1	1	1	1½

REGULAR EXTRA HEAVY ROLLED STEEL WELDING FLANGE

All dimensions except bore are finished dimensions.

SHRUNK AND PIENED FLANGES

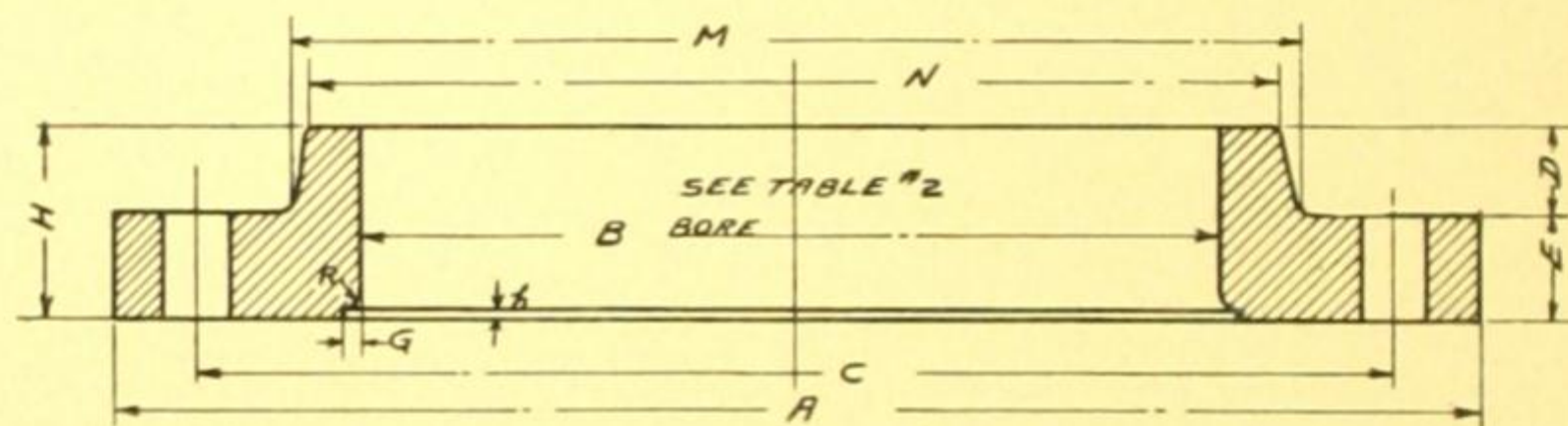


SIZE	6	7	8	9	10	12	14	15	16	18	20	22	24
A	12	14	15	16	17	20	22	23	25	27	29	31	34
B	6	7	8	9	10	12	14	15	16	18	20	22	24
C	10	11	13	14	15	17	20	21	22	24	26	28	31
D	2	2	2	2	2	2	2	2	2	2	2	2	2
E	1	1	1	1	1	1	1	1	1	1	1	1	1
H	3	3	3	4	4	4	4	4	4	4	5	5	5
M	8	9	10	11	12	15	16	17	18	20	22	24	26
N	8	9	10	11	12	14	16	17	18	20	22	24	26
Nº HOLES	12	12	12	12	16	16	20	20	20	24	24	28	28
DIA HOLES	1/2	1	1	1	1	1	1	1	1	1	1	1	1
PAT. N.º													

TABLE-2-

THICKNESS OF PIPE	1"	1 1/2"	2"	2 1/2"	3"
h	1/4"	3/8"	1/2"	5/8"	3/4"
G	1/8"	1/4"	3/8"	1/2"	5/8"
R	1/8"	1/4"	3/8"	1/2"	5/8"

EXTRA HEAVY CAST IRON SHRUNK AND PIENED FLANGE



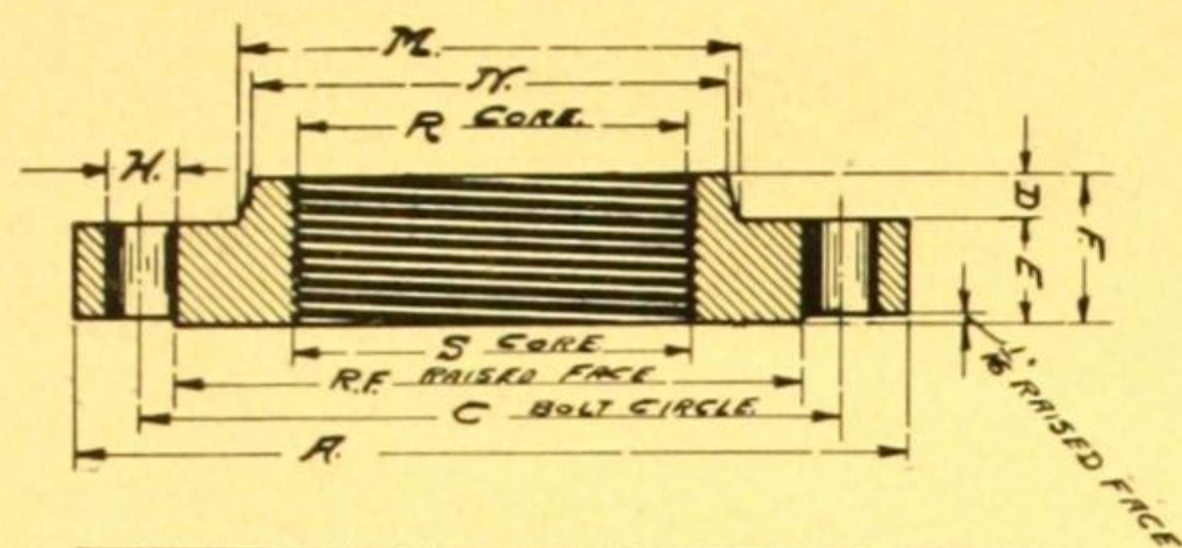
SIZE	6	7	8	9	10	11	12	14	15	16	18	20	22	24	26	28	30
A	11	12	13	15	16	17	19	21	22	23	25	27	29	31	33	36	38
B	6	7	8	9	10	11	12	14	15	16	18	20	22	24	26	28	30
C	9	10	11	13	14	15	17	18	20	21	22	25	27	29	31	33	36
D	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
E	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
H	2	2	2	2	2	2	3	3	3	3	3	3	3	3	4	4	4
N	7	8	9	10	12	13	14	15	16	17	20	22	24	26	28	30	32
M	8	9	10	11	12	13	14	16	17	18	20	22	24	26	28	30	32
Nº HOLES	8	8	8	12	12	12	12	12	16	16	16	20	20	20	24	28	28
DIA HOLES	3/4	3/4	3/4	3/4	3/4	3/4	7/8	1	1	1	1	1	1	1	1	1	1
PAT. N.º	434	435	436	437	438	439	250	251	252	253	254	255	256	257	258	259	303

TABLE-2-

THICKNESS OF PIPE	1"	1 1/2"	2"	2 1/2"	3"
h	1/4"	3/8"	1/2"	5/8"	3/4"
G	1/8"	1/4"	3/8"	1/2"	5/8"
R	1/8"	1/4"	3/8"	1/2"	5/8"

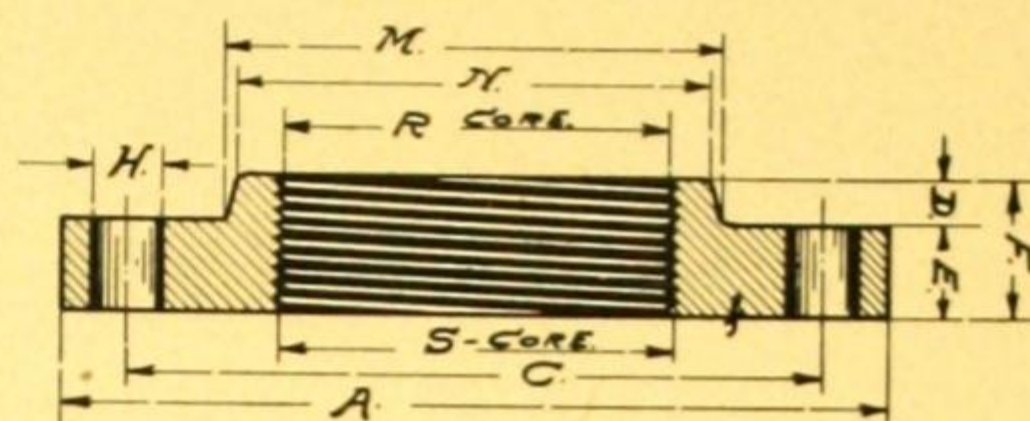
STANDARD CAST IRON SHRUNK AND PIENED FLANGE

CAST IRON SCREWED FLANGES



PIPE SIZE	A	E	D	F	M	N	DIA R.F.	HUB FACE	CORE R.	CORE S.	C	H	NO HUBS
1	4 1/2	3/4	1/4	1	2 1/16	1 1/16	2 5/8	1/16			3 1/4	5/8	4
1 1/4	5	13/16	5/16	1 1/8	2 1/8	2 3/8	3 1/8	1/16			3 3/4	5/8	4
1 1/2	6	7/8	3/8	1 1/4	2 3/8	2 3/4	3 3/8	1/16			4 1/2	5/8	4
2	6 1/2	15/16	7/16	1 3/8	3 1/8	3 1/4	4 1/4	1/16			5	3/4	4
2 1/2	7 1/2	1/8	3/8	1 7/16	4	3 3/8	5	1/16	2 3/4	2 3/4	5 3/8	3/4	4
3	8 1/4	1 1/16	3/8	1 7/16	4 5/8	4 1/2	5 3/8	1/16	3 3/8	3 3/8	6 5/8	3/4	8
3 1/2	9	1 1/4	3/8	1 5/8	5 1/4	5 1/8	6 1/2	1/16	3 7/8	3 7/8	7 1/4	3/4	8
4	10	1 5/16	7/16	1 3/4	5 3/4	5 5/8	7	1/16	4 1/8	4 1/8	7 3/8	3/4	8
4 1/2	10 1/2	1 3/8	7/16	1 13/16	6 3/8	6	7 5/8	1/16	4 1/2	4 1/2	8 1/2	3/4	8
5	11	1 7/16	7/16	1 7/8	6 3/4	6	8 3/8	1/16	5 3/8	5 3/8	9 1/4	3/4	8
6	12 1/2	1 1/2	1/2	2	7 5/8	7 3/8	9 3/8	1/16	6 5/8	6 5/8	10 5/8	3/4	12
7	14	1 9/16	1/2	2 1/8	9	8 3/8	10 3/8	1/16	7 5/8	7 5/8	11 3/8	1	12
8	15	1 11/16	1/2	2 3/8	10 1/8	10	12	1/16	8 3/8	8 3/8	13	1	12
9	16	1 13/16	7/16	2 1/4	11 1/8	10 13/16	13	1/16			14	1	12
10	17 1/2	1 15/16	7/16	2 3/8	12 3/8	12 1/4	14 1/4	1/16	10 3/8	10 3/8	15 1/4	1	16
12	20	2 1/16	1/2	2 5/8	14 5/8	14 1/2	16 3/4	1/16			17 3/4	1	16
14	22 1/2	2 3/16	1/2	2 5/8	15 3/8	15 3/4	19	1/16			20	1	20
15	23 1/2	2 1/4	9/16	2 13/16	17	16 7/8	19 3/8	1/16			21	1 1/8	20
16	25	2 5/16	9/16	2 7/8	18	17 3/8	21 3/8	1/16			22 1/2	1 1/8	20
18	27	2 7/16	5/8	3 1/16	20 1/8	20	23 3/8	1/16			24 1/2	1 1/8	24
20	29 1/2	2 9/16	1/2	3 1/4	22 3/8	22 1/4	25 1/2	1/16			26 3/4	1 1/4	24
22	31 1/2	2 11/16	1/2	3 3/8	24 1/8	24 3/8	27 1/2	1/16			28 3/4	1 1/2	28
24	34	2 13/16	1/2	3 5/8	26 3/8	26 3/8	30	1/16			31 1/4	1 1/2	28

EXTRA HEAVY CAST IRON SCREWED FLANGE FOR
PRESSURE UP TO 250 POUNDS



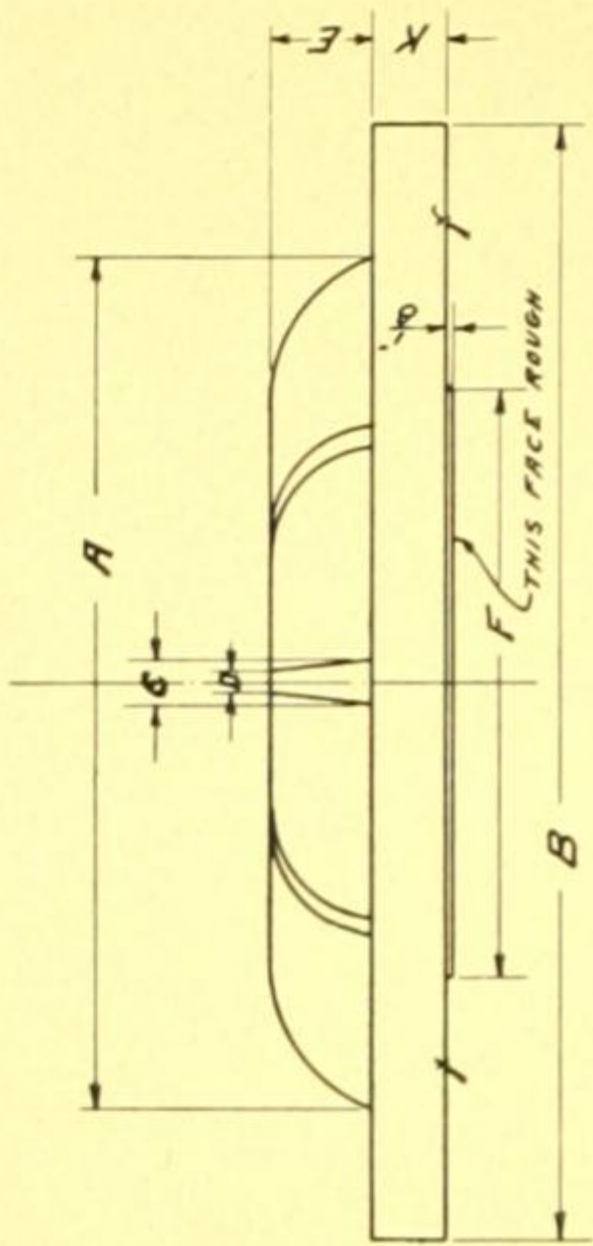
PIPE SIZE	A	E	D	F	M	N	CORE R.	CORE S.	C	H	NO HUBS
3/4	3 1/2	7/16	3/16	3/8	1 1/2	1 3/8			2 1/2	1/2	4
1	4	7/16	1/4	1/2	1 5/8	1 1/2			3	9/16	4
1 1/4	4 1/2	1/2	1/4	3/4	2 5/8	2 1/8			3 3/8	9/16	4
1 1/2	5	9/16	5/16	1/2	2 3/8	2 1/2			3 3/8	5/8	4
2	6	5/8	3/8	1	3 3/8	3			4 3/8	5/8	4
2 1/2	7	11/16	3/8	1 1/8	3 3/8	3 1/2	2 3/4	2 3/4	5 1/2	5/8	4
3	7 1/2	3/4	3/8	1 1/8	4 5/8	4 1/4	3 3/8	3 3/8	6	5/8	4
3 1/2	8 1/2	13/16	3/8	1 1/8	4 3/8	4 3/4	3 1/4	3 1/4	7	5/8	4
4	9	15/16	1/2	1 1/8	5 3/8	5 1/4	4 3/8	4 3/8	7 1/2	3/4	4
4 1/2	9 1/4	15/16	5/16	1 1/4	5 1/8	5 5/8	4 1/2	4 1/2	7 3/4	3/4	8
5	10	15/16	5/16	1 1/4	6 1/8	6 1/4	5 1/2	5 1/2	8 1/2	3/4	8
6	11	1	7/16	1 1/4	7 3/8	7 3/8	6 1/2	6 1/2	9 1/2	3/4	8
7	12 1/2	1 1/16	7/16	1 1/2	8 3/8	8 1/2	7 5/8	7 5/8	10 3/4	3/4	8
8	13 1/2	1 1/8	1/2	1 5/8	9 1/8	9 1/2	8 3/8	8 3/8	11 3/4	3/4	8
9	15	1 1/8	5/8	1 3/4	10 3/8	10 1/2			13 1/4	3/4	12
10	16	1 1/16	11/16	1 7/8	11 1/8	11 3/4	10 3/8	10 3/8	14 1/4	3/4	12
12	19	1 1/4	13/16	2 1/8	14 1/8	14			17	3/4	12
14	21	1 3/8	13/16	2 3/8	15 3/8	15 1/4			18 3/4	1	12
15	22 1/4	1 5/8	15/16	2 5/8	16 3/8	16 1/4			20	1	16
16	23 1/2	1 7/16	1	2 7/8	17 1/8	17 1/2			21 1/4	1	16
18	25	1 9/16	1 1/16	2 3/4	19 1/8	19 3/8			22 3/8	1 1/8	16
20	27 1/2	1 11/16	1 1/8	2 3/4	21 3/8	21 9/16			25	1 1/8	20
22	29 1/2	1 13/16	1 1/8	2 3/4	23 3/8	23 1/2			27 1/4	1 1/8	20
24	32	1 3/4	1 1/8	3	26	25 1/2			29 1/2	1 1/8	20

STANDARD CAST IRON SCREWED FLANGE
FOR PRESSURE UP TO 125 POUNDS

NOTE—For Hubs of Reducing Flanges use dimensions corresponding to size of pipe for which reducing flange is to be tapped.

Reducing Flanges are always of same thickness as Blind Flanges of corresponding outside diameters.

CAST IRON BLIND FLANGES



STANDARD.									
SIZE PIPE	B	K	F	A	C	D	E	NO OF RIBS	DRILLING
12"	19"	1 7/8"	10"	14 1/2"	3/4"	3/8"	1 1/4"	8	282 12-7/8-17"
14"	21"	1 7/8"	12"	14 1/2"	3/4"	3/8"	1 1/4"	8	282 12-1-10 3/4"
15"	22 1/2"	1 7/8"	13"	14 1/2"	3/4"	3/8"	1 1/4"	8	282 16-1-20"
16"	23 1/2"	1 7/8"	14"	14 1/2"	3/4"	3/8"	1 1/4"	8	282 16-1-21 1/4"
18"	25"	1 7/8"	16"	20"	7/8"	7/16"	2 3/8"	8	283 16-1/8-22 3/4"
20"	27 1/2"	1 7/8"	18"	20"	7/8"	7/16"	2 3/8"	8	283 20-1/8-25"
22"	29 1/2"	1 7/8"	20"	20"	7/8"	7/16"	2 3/8"	8	283 20-1/8-27 1/4"
24"	31 1/2"	1 7/8"	22"	24"	1"	1/2"	2 1/2"	8	267 20-1/8-29 1/2"
26"	33 3/4"	1 7/8"	24"	24"	1"	1/2"	2 1/2"	8	267 24-1/8-31 1/4"
28"	36"	1 7/8"	26"	24"	1"	1/2"	2 1/2"	8	267 28-1/8-33 1/2"
30"	38"	1 7/8"	28"	24"	1"	1/2"	2 1/2"	8	267 28-1/8-36"

EXTRA HEAVY									
SIZE PIPE	B	K	F	A	C	D	E	NO OF RIBS	DRILLING
12"	20"	1 7/8"	10"	14 1/2"	3/4"	3/8"	1 1/4"	8	282 16-1-17 3/4"
14"	22 1/2"	2"	12"	14 1/2"	3/4"	3/8"	1 1/4"	8	282 20-1-20"
15"	23 1/2"	2 1/8"	13"	14 1/2"	3/4"	3/8"	1 1/4"	8	282 20-1/8-21"
16"	25"	2 1/8"	14"	20"	7/8"	7/16"	2 1/8"	8	283 20-1/8-22 1/2"
18"	27"	2 1/8"	16"	20"	7/8"	7/16"	2 1/8"	8	283 24-1/8-24 1/2"
20"	29 1/2"	2 3/8"	18"	20"	7/8"	7/16"	2 3/8"	8	283 24-1/4-26 3/4"
22"	31 1/2"	2 1/2"	20"	24"	1"	1/2"	2 1/2"	8	267 28-1/4-28 3/4"

STANDARD AND EXTRA HEAVY CAST IRON BLIND FLANGE

DRILLING TABLES

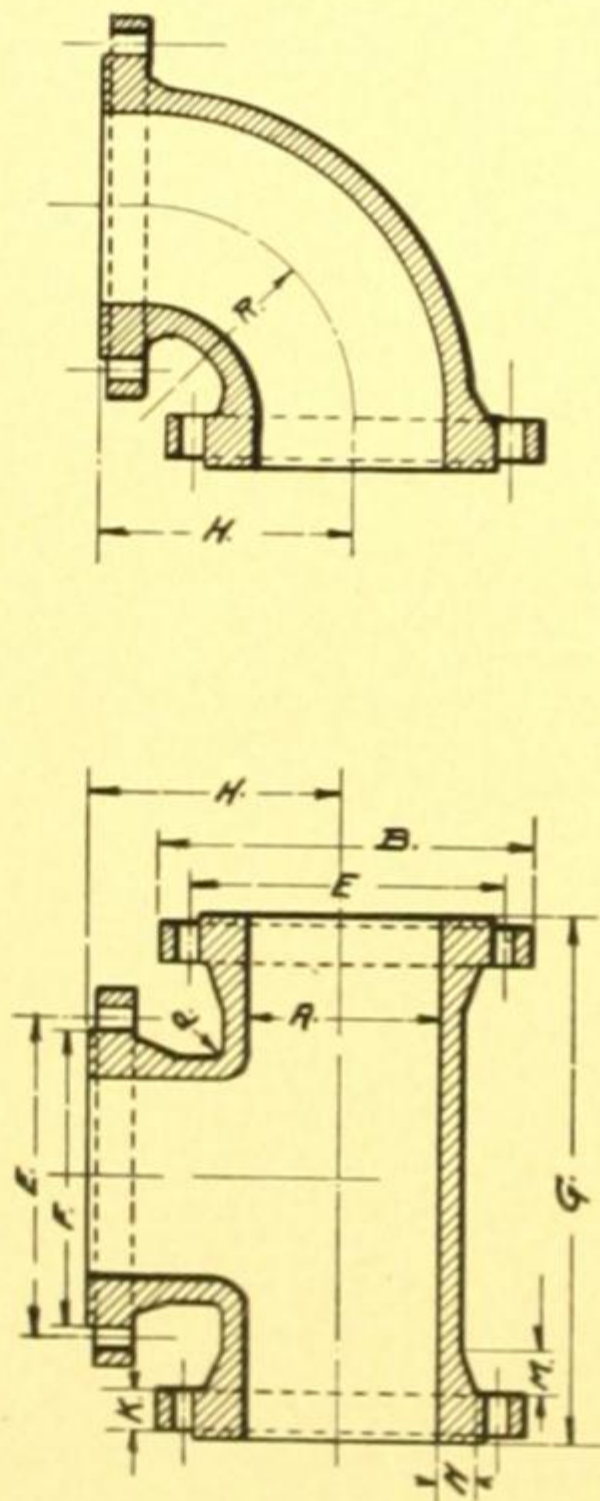
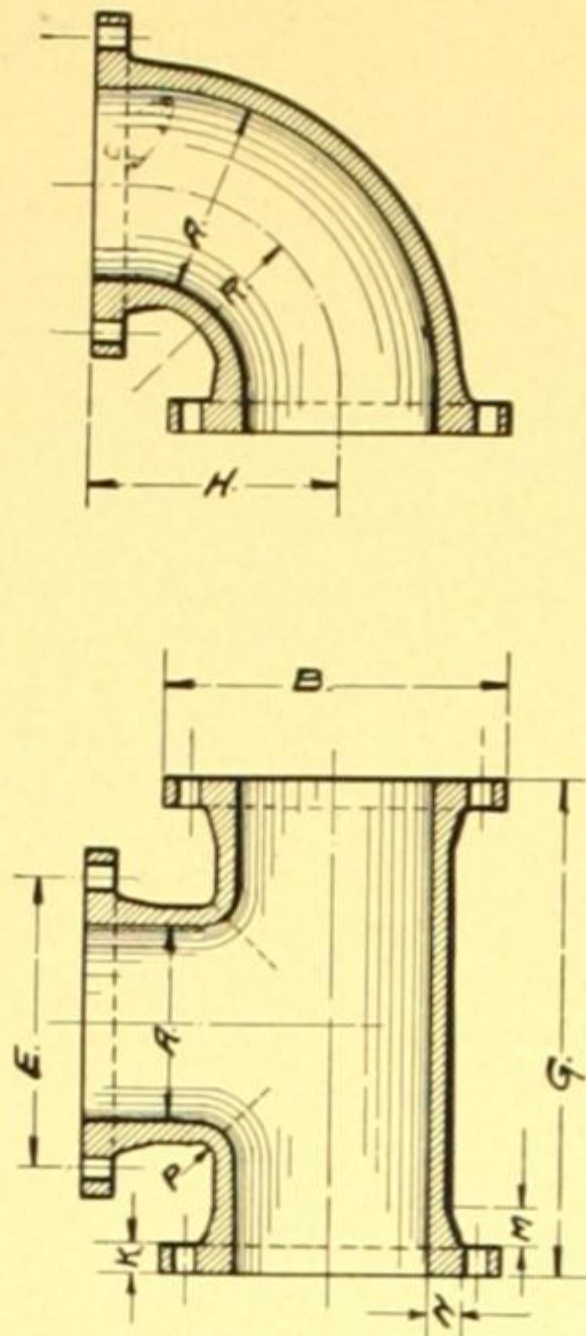
PIPE SIZE INCHES.	THICKNESS NEAREST FRACTION - INCHES.	DIAMETER FLANGE INCHES.	THICKNESS FLANGE - INS.	WIDTH FLANGE FACE. INCHES.	DIAMETER BOLT-CIRCLE INCHES.	N° OF BOLTS.	DIAMETER BOLT INCHES.	LENGTH BOLT -INS.
2	7/16	6	5/8	2	4 1/2	4	1/2	5 1/2
2 1/2	7/16	7	11/16	2 1/4	5 1/2	4	1/2	5 1/2
3	7/16	7 1/2	3/4	2 1/4	6	4	1/2	5 1/2
3 1/2	1/2	8 1/2	13/16	2 1/2	7	4	1/2	5 1/2
4	1/2	9	15/16	2 1/2	7 1/2	4	5/8	5 1/2
4 1/2	1/2	9 1/4	15/16	2 3/8	7 3/4	8	5/8	5 1/2
5	1/2	10	15/16	2 1/2	8 1/2	8	5/8	5 1/2
6	9/16	11	1	2 1/2	9 1/2	8	5/8	5 1/2
7	5/8	12 1/2	1 1/16	2 3/4	10 3/4	8	5/8	5 1/2
8	5/8	13 1/2	1 1/8	2 3/4	11 1/2	8	5/8	5 1/2
9	11/16	15	1 1/8	3	13 1/4	12	5/8	5 1/2
10	3/4	16	1 3/16	3	14 1/4	12	3/4	5 1/2
12	13/16	19	1 1/4	3 1/2	17	12	3/4	5 1/2
14	7/8	21	1 3/8	3 1/2	18 3/4	12	7/8	5 1/2
15	15/16	22 1/4	1 3/8	3 5/8	20	16	7/8	5 1/2
16	1	23 1/2	1 7/8	3 3/4	21 1/4	16	7/8	5 1/2
18	1 1/16	25	1 9/16	3 1/2	22 3/4	16	1	5 1/2
20	1 1/8	27 1/2	1 11/16	3 3/4	25	20	1	5 1/2
22	1 3/16	29 1/2	1 13/16	3 3/4	27 1/4	20	1	5 1/2
24	1 1/4	31 1/2	1 1 1/8	3 3/4	29 1/4	20	1	5 1/2
26	1 5/16	33 3/4	1 5/8	4	31 1/4	24	1	5 1/2
28	1 3/8	36 1/2	1 3/4	4	33 1/4	28	1	5 1/2
30	1 1/2	38 3/8	1 7/8	4	35 1/4	28	1 1/8	5 1/2
36	1 3/4	44 1/2	2 1/8	4 1/4	42 1/4	32	1 1/8	5 1/2
42	2	51 5/8	2 3/8	4 1/2	48 1/4	36	1 1/4	5 1/2
48	2 1/4	57 1/2	2 1/2	4 3/4	54 1/4	44	1 3/8	5 1/2

STANDARD DRILLING

SIZE OF PIPE. INCHES.	DIAMETER FLANGE INCHES.	THICKNESS FLANGE INCHES.	DIAMETER BOLT-CIRCLE INCHES.	NUMBER OF BOLTS.	DIAMETER BOLTS. INCHES.
2	6 1/2	7/8	5	4	5/8
2 1/2	7 1/2	1	5 7/8	4	3/4
3	8 1/4	1 1/8	6 5/8	8	5/8
3 1/2	9	1 3/16	7 1/4	8	5/8
4	10	1 1/4	7 7/8	8	3/4
4 1/2	10 1/2	1 5/16	8 1/2	8	3/4
5	11	1 3/8	9 1/4	8	3/4
6	12 1/2	1 7/16	10 5/8	12	3/4
7	14	1 1/2	11 7/8	12	7/8
8	15	1 5/8	13	12	7/8
9	16	1 3/4	14	12	7/8
10	17 1/2	1 7/8	15 1/4	16	7/8
12	20	2	17 3/4	16	7/8
14	22 1/2	2 1/8	20	20	7/8
15	23 1/2	2 3/16	21	20	1
16	25	2 1/4	22 1/2	20	1
18	27	2 3/8	24 1/2	24	1
20	29 1/2	2 1/2	26 3/4	24	1 1/8
22	31 1/2	2 5/8	28 3/4	28	1 1/8
24	34	2 3/4	31 1/4	28	1 1/8

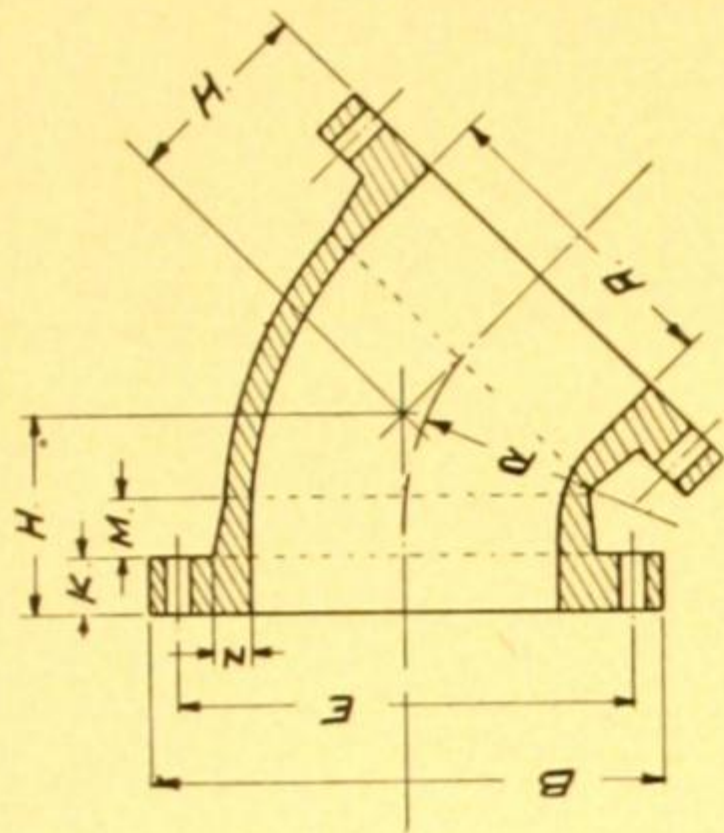
EXTRA HEAVY DRILLING

LONG FILLET FITTINGS

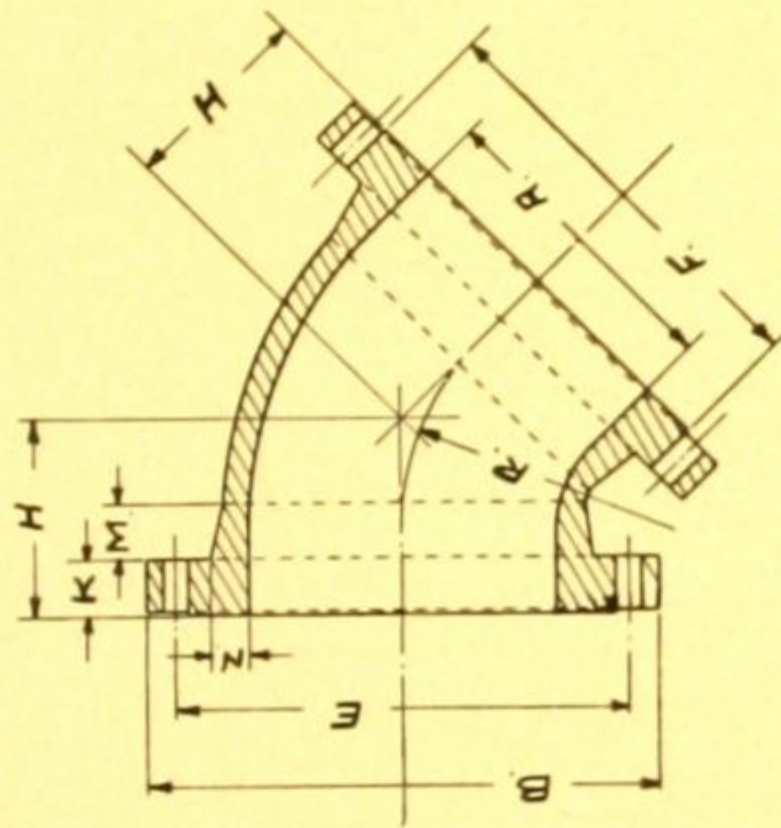


SIZE	FACE TO FACE	CENTER TO CENTER	OD FLANGE	DIA BOLT CIRCLE	NO BOLTS	DIA BOLT HOLES	THICK FLGS	INSIDE DIA.	THICK FILLET	LENN FILLET	FILLET RADIUS	ELBOW RADIUS
9	17	28	11	3/4	8	1/2	1	6	3/16	2 1/2	3/4	2 1/2
10	18	30	12	7/8	8	5/8	1	7	3/8	2 1/2	3/4	2 1/2
12	20	32	13	1	8	3/4	1 1/2	8	7/8	2 1/2	3/4	2 1/2
14	22	34	15	1 1/8	12	7/8	1 1/2	10	1	2	3/4	2 1/2
16	24	36	16	1 1/4	16	1	1 1/2	12	1 1/8	2	3/4	2 1/2
18	26	38	18	1 1/2	16	1 1/8	1 1/2	14	1 1/4	2	3/4	2 1/2
20	28	40	20	1 3/4	20	1 1/4	1 1/2	16	1 1/2	2 1/2	3/4	2 1/2
22	30	42	22	2	20	1 1/2	1 1/2	18	1 3/4	2 1/2	3/4	2 1/2
24	32	44	24	2 1/8	20	1 3/4	1 1/2	20	2	2 1/2	3/4	2 1/2
26	34	46	26	2 1/4	24	1 3/4	1 1/2	22	2 1/8	2 1/2	3/4	2 1/2
28	36	48	28	2 3/8	28	1 3/4	1 1/2	24	2 1/4	2 1/2	3/4	2 1/2
30	38	50	30	2 3/4	28	1 3/4	1 1/2	26	2 3/8	2 1/2	3/4	2 1/2
36	44	56	36	3	36	1 3/4	1 1/2	30	3	2 1/2	3/4	2 1/2
42	50	62	42	3 1/4	40	1 3/4	1 1/2	36	3 1/4	2 1/2	3/4	2 1/2
48	56	68	48	3 1/2	48	1 3/4	1 1/2	42	3 1/2	2 1/2	3/4	2 1/2
54	62	74	54	3 3/4	52	1 3/4	1 1/2	48	3 3/4	2 1/2	3/4	2 1/2
60	68	80	60	4	60	1 3/4	1 1/2	54	4	2 1/2	3/4	2 1/2
66	74	86	66	4 1/4	68	1 3/4	1 1/2	60	4 1/4	2 1/2	3/4	2 1/2
72	80	92	72	4 1/2	72	1 3/4	1 1/2	66	4 1/2	2 1/2	3/4	2 1/2
78	86	98	78	4 3/4	76	1 3/4	1 1/2	72	4 3/4	2 1/2	3/4	2 1/2
84	92	104	84	4 5/8	84	1 3/4	1 1/2	78	4 5/8	2 1/2	3/4	2 1/2
90	98	110	90	4 3/4	88	1 3/4	1 1/2	84	4 3/4	2 1/2	3/4	2 1/2
96	104	116	96	4 7/8	92	1 3/4	1 1/2	90	4 7/8	2 1/2	3/4	2 1/2
102	110	122	102	5	96	1 3/4	1 1/2	96	5	2 1/2	3/4	2 1/2
108	116	128	108	5 1/8	100	1 3/4	1 1/2	102	5 1/8	2 1/2	3/4	2 1/2
114	122	134	114	5 1/4	104	1 3/4	1 1/2	108	5 1/4	2 1/2	3/4	2 1/2
120	128	140	120	5 3/8	108	1 3/4	1 1/2	114	5 3/8	2 1/2	3/4	2 1/2
126	134	146	126	5 1/2	112	1 3/4	1 1/2	120	5 1/2	2 1/2	3/4	2 1/2
132	140	152	132	5 5/8	116	1 3/4	1 1/2	126	5 5/8	2 1/2	3/4	2 1/2
138	146	158	138	5 3/4	120	1 3/4	1 1/2	132	5 3/4	2 1/2	3/4	2 1/2
144	152	164	144	5 7/8	124	1 3/4	1 1/2	138	5 7/8	2 1/2	3/4	2 1/2
150	158	170	150	6	128	1 3/4	1 1/2	144	6	2 1/2	3/4	2 1/2
156	164	176	156	6 1/8	132	1 3/4	1 1/2	150	6 1/8	2 1/2	3/4	2 1/2
162	170	182	162	6 1/4	136	1 3/4	1 1/2	156	6 1/4	2 1/2	3/4	2 1/2
168	176	188	168	6 3/8	140	1 3/4	1 1/2	162	6 3/8	2 1/2	3/4	2 1/2
174	182	194	174	6 1/2	144	1 3/4	1 1/2	168	6 1/2	2 1/2	3/4	2 1/2
180	188	200	180	6 5/8	148	1 3/4	1 1/2	174	6 5/8	2 1/2	3/4	2 1/2
186	194	206	186	6 3/4	152	1 3/4	1 1/2	180	6 3/4	2 1/2	3/4	2 1/2
192	200	212	192	6 7/8	156	1 3/4	1 1/2	186	6 7/8	2 1/2	3/4	2 1/2
198	206	218	198	7	160	1 3/4	1 1/2	192	7	2 1/2	3/4	2 1/2
204	212	224	204	7 1/8	164	1 3/4	1 1/2	198	7 1/8	2 1/2	3/4	2 1/2
210	218	230	210	7 1/4	168	1 3/4	1 1/2	204	7 1/4	2 1/2	3/4	2 1/2
216	224	236	216	7 3/8	172	1 3/4	1 1/2	210	7 3/8	2 1/2	3/4	2 1/2
222	230	242	222	7 1/2	176	1 3/4	1 1/2	216	7 1/2	2 1/2	3/4	2 1/2
228	236	248	228	7 5/8	180	1 3/4	1 1/2	222	7 5/8	2 1/2	3/4	2 1/2
234	242	254	234	7 3/4	184	1 3/4	1 1/2	228	7 3/4	2 1/2	3/4	2 1/2
240	248	260	240	7 7/8	188	1 3/4	1 1/2	234	7 7/8	2 1/2	3/4	2 1/2
246	254	266	246	8	192	1 3/4	1 1/2	240	8	2 1/2	3/4	2 1/2
252	260	272	252	8 1/8	196	1 3/4	1 1/2	246	8 1/8	2 1/2	3/4	2 1/2
258	266	278	258	8 1/4	200	1 3/4	1 1/2	252	8 1/4	2 1/2	3/4	2 1/2
264	272	284	264	8 3/8	204	1 3/4	1 1/2	258	8 3/8	2 1/2	3/4	2 1/2
270	278	290	270	8 1/2	208	1 3/4	1 1/2	264	8 1/2	2 1/2	3/4	2 1/2
276	284	296	276	8 5/8	212	1 3/4	1 1/2	270	8 5/8	2 1/2	3/4	2 1/2
282	290	302	282	8 3/4	216	1 3/4	1 1/2	276	8 3/4	2 1/2	3/4	2 1/2
288	296	308	288	8 7/8	220	1 3/4	1 1/2	282	8 7/8	2 1/2	3/4	2 1/2
294	302	314	294	9	224	1 3/4	1 1/2	288	9	2 1/2	3/4	2 1/2
300	308	320	300	9 1/8	228	1 3/4	1 1/2	294	9 1/8	2 1/2	3/4	2 1/2
306	314	326	306	9 1/4	232	1 3/4	1 1/2	300	9 1/4	2 1/2	3/4	2 1/2
312	320	332	312	9 3/8	236	1 3/4	1 1/2	306	9 3/8	2 1/2	3/4	2 1/2
318	326	338	318	9 1/2	240	1 3/4	1 1/2	312	9 1/2	2 1/2	3/4	2 1/2
324	332	344	324	9 5/8	244	1 3/4	1 1/2	318	9 5/8	2 1/2	3/4	2 1/2
330	338	350	330	9 3/4	248	1 3/4	1 1/2	324	9 3/4	2 1/2	3/4	2 1/2
336	344	356	336	9 7/8	252	1 3/4	1 1/2	330	9 7/8	2 1/2	3/4	2 1/2
342	350	362	342	10	256	1 3/4	1 1/2	336	10	2 1/2	3/4	2 1/2
348	356	368	348	10 1/8	260	1 3/4	1 1/2	342	10 1/8	2 1/2	3/4	2 1/2
354	362	374	354	10 1/4	264	1 3/4	1 1/2	348	10 1/4	2 1/2	3/4	2 1/2
360	368	380	360	10 3/8	268	1 3/4	1 1/2	354	10 3/8	2 1/2	3/4	2 1/2
366	374	386	366	10 1/2	272	1 3/4	1 1/2	360	10 1/2	2 1/2	3/4	2 1/2
372	380	392	372	10 5/8	276	1 3/4	1 1/2	366	10 5/8	2 1/2	3/4	2 1/2
378	386	398	378	10 3/4	280	1 3/4	1 1/2	372	10 3/4	2 1/2	3/4	2 1/2
384	392	404	384	10 7/8	284	1 3/4	1 1/2	378	10 7/8	2 1/2	3/4	2 1/2
390	398	410	390	11	288	1 3/4	1 1/2	384	11	2 1/2	3/4	2 1/2
396	404	416	396	11 1/8	292	1 3/4	1 1/2	390	11 1/8	2 1/2	3/4	2 1/2
402	410	422	402	11 1/4	296	1 3/4	1 1/2	396	11 1/4	2 1/2	3/4	2 1/2
408	416	428	408	11 3/8	300	1 3/4	1 1/2	402	11 3/8	2 1/2	3/4	2 1/2
414	422	434	414	11 1/2	304	1 3/4	1 1/2	408	11 1/2	2 1/2	3/4	2 1/2
420	428	440	420	11 5/8	308	1 3/4	1 1/2	414	11 5/8	2 1/2	3/4	2 1/2
426	434	446	426	11 3/4	312	1 3/4	1 1/2	420	11 3/4	2 1/2	3/4	2 1/2
432	440	452	432	11 7/8	316	1 3/4	1 1/2	426	11 7/8	2 1/2	3/4	2 1/2
438	446	458	438	12	320	1 3/4	1 1/2	432	12	2 1/2	3/4	2 1/2
444	452	464	444	12 1/8	324	1 3/4	1 1/2	438	12 1/8	2 1/2	3/4	2 1/2
450	458	470	450	12 1/4	328	1 3/4	1 1/2	444	12 1/4	2 1/2	3/4	2 1/2
456	464	476	456	12 3/8	332	1 3/4	1 1/2	450	12 3/8	2 1/2	3/4	2 1/2
462	470	482	462	12 1/2	336	1 3/4	1 1/2	456	12 1/2	2 1/2	3/4	2 1/2
468	476	488	468	12 5/8	340	1 3/4	1 1/2	462	12 5/8	2 1/2	3/4	2 1/2
474	482	494	474	12 3/4	344	1 3/4	1 1/2	468	12 3/4	2 1/2	3/4	2 1/2
480	488	500	480	12 7/8	348	1 3/4	1 1/2	474	12 7/8	2 1/2	3/4	2 1/2
486	494	506	486	13	352	1 3/4	1 1/2	480	13	2 1/2	3/4	2 1/2
492	500	512	492	13 1/8	356	1 3/4	1 1/2	486	13 1/8	2 1/2	3/4	2 1/2
498	506	518	498	13 1/4	360	1 3/4	1 1/2	492	13 1/4	2 1/2	3/4	2 1/2
504	512	524	504	13 3/8	364	1 3/4	1 1/2	498	13 3/8	2 1/2	3/4	2 1/2
510	518	530	510	13 1/2	368	1 3/4	1 1/2	504	13 1/2	2 1/2	3/4	2 1/2
516	524	536	516	13 5/8	372	1 3/4	1 1/2	510	13 5/8	2 1/2	3/4	2 1/2
522	530	542	522	13 3/4	376	1 3/4	1 1/2	516	13 3/4	2 1/2	3/4	2 1/2
528	536	548	528	13 7/8	380	1 3/4	1 1/2	522	13 7/8	2 1/2	3/4	2 1/2
534	542	554	534	14	384	1 3/4	1 1/2	528	14	2 1/2	3/4	2 1/2
540	548	560	540	14 1/8	388	1 3/4	1 1/2	534	14 1/8	2 1/2	3/4	2 1/2
546	554	566	546	14 1/4	392	1 3/4	1 1/2	540	14 1/4	2 1/2	3/4	2 1/2
552	560	572	552	14 3/8	396	1 3/4	1 1/2	546	14 3/8	2 1/2	3/4	2 1/2
558	566	578	558	14 1/2	400	1 3/4	1 1/2	552	14 1/2	</		

LONG FILLET FITTINGS



SIZE OF FITTING	H	TO FACE	OD FLANGE	DIA BOLT CIRCLE	NB BOLTS	DIA BOLT HOLES	K	THICKNESS OF FLANGES	INSIDE DIA	N	THICKNESS OF FILLET	M	LENGTH OF FILLET	R	ELBOW RADIUS
5															
6															
7															
8	5 1/2	1 1/2	1 1/2	1 1/2	8	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2
9	5 3/4	1 3/4	1 3/4	1 3/4	12	1 3/4	1 3/4	1 3/4	1 3/4	1 3/4	1 3/4	1 3/4	1 3/4	1 3/4	1 3/4
10	5 7/8	1 7/8	1 7/8	1 7/8	16	1 7/8	1 7/8	1 7/8	1 7/8	1 7/8	1 7/8	1 7/8	1 7/8	1 7/8	1 7/8
12	6 1/4	2 1/4	2 1/4	2 1/4	20	2 1/4	2 1/4	2 1/4	2 1/4	2 1/4	2 1/4	2 1/4	2 1/4	2 1/4	2 1/4
14	7	2 1/2	2 1/2	2 1/2	24	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2
15	7 1/4	2 3/4	2 3/4	2 3/4	28	2 3/4	2 3/4	2 3/4	2 3/4	2 3/4	2 3/4	2 3/4	2 3/4	2 3/4	2 3/4
16	7 1/2	2 1/2	2 1/2	2 1/2	32	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2
18	8	3	3	3	36	3	3	3	3	3	3	3	3	3	3
20	9	3 1/4	3 1/4	3 1/4	40	3 1/4	3 1/4	3 1/4	3 1/4	3 1/4	3 1/4	3 1/4	3 1/4	3 1/4	3 1/4
22	10	3 1/2	3 1/2	3 1/2	44	3 1/2	3 1/2	3 1/2	3 1/2	3 1/2	3 1/2	3 1/2	3 1/2	3 1/2	3 1/2
24	11	3 3/4	3 3/4	3 3/4	48	3 3/4	3 3/4	3 3/4	3 3/4	3 3/4	3 3/4	3 3/4	3 3/4	3 3/4	3 3/4
26	11 1/2	3 1/2	3 1/2	3 1/2	52	3 1/2	3 1/2	3 1/2	3 1/2	3 1/2	3 1/2	3 1/2	3 1/2	3 1/2	3 1/2
28	12	3 3/4	3 3/4	3 3/4	56	3 3/4	3 3/4	3 3/4	3 3/4	3 3/4	3 3/4	3 3/4	3 3/4	3 3/4	3 3/4
30	13	3 3/4	3 3/4	3 3/4	60	3 3/4	3 3/4	3 3/4	3 3/4	3 3/4	3 3/4	3 3/4	3 3/4	3 3/4	3 3/4
36															
42															



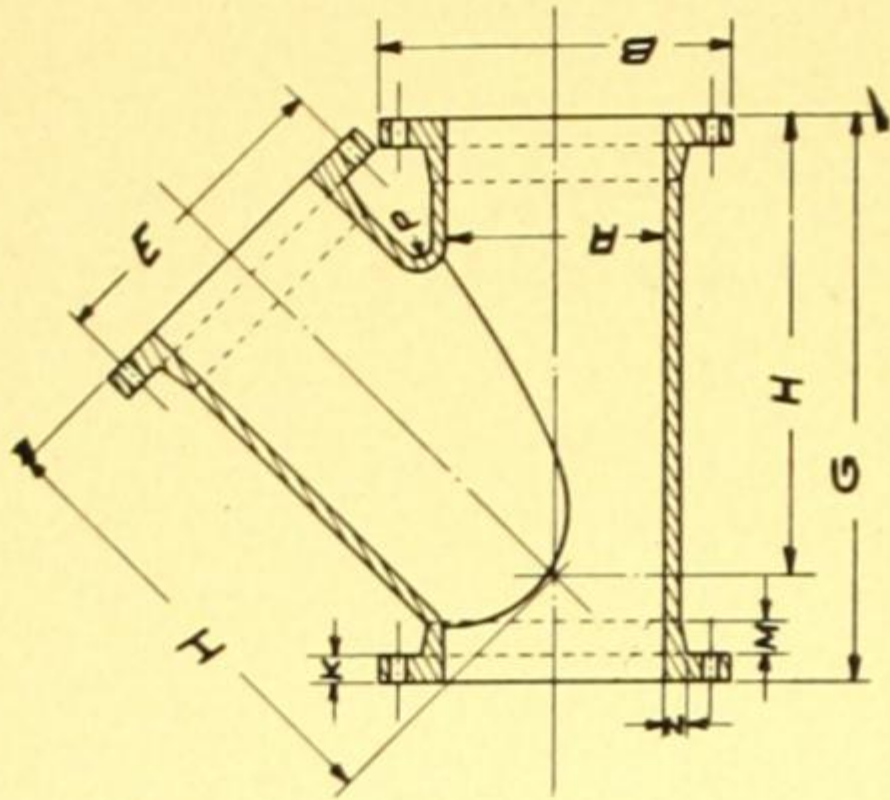
SIZE OF FITTING	H	TO FACE	OD FLANGE	DIA BOLT CIRCLE	NB BOLTS	DIA BOLT HOLES	K	THICKNESS OF FLANGES	INSIDE DIA	F	RAISED FACE 1/8 THICK	N	LENGTH OF FILLET	M	ELBOW RADIUS
5															
6															
7															
8	6	1 1/2	1 1/2	1 1/2	12	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2
9	6 1/4	1 3/4	1 3/4	1 3/4	16	1 3/4	1 3/4	1 3/4	1 3/4	1 3/4	1 3/4	1 3/4	1 3/4	1 3/4	1 3/4
10	6 1/2	1 7/8	1 7/8	1 7/8	20	1 7/8	1 7/8	1 7/8	1 7/8	1 7/8	1 7/8	1 7/8	1 7/8	1 7/8	1 7/8
12	7 1/4	2 1/4	2 1/4	2 1/4	24	2 1/4	2 1/4	2 1/4	2 1/4	2 1/4	2 1/4	2 1/4	2 1/4	2 1/4	2 1/4
14	8 1/4	2 3/4	2 3/4	2 3/4	28	2 3/4	2 3/4	2 3/4	2 3/4	2 3/4	2 3/4	2 3/4	2 3/4	2 3/4	2 3/4
15	8 1/2	2 1/2	2 1/2	2 1/2	32	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2
16	9	2 3/4	2 3/4	2 3/4	36	2 3/4	2 3/4	2 3/4	2 3/4	2 3/4	2 3/4	2 3/4	2 3/4	2 3/4	2 3/4
18	9 1/2	3	3	3	40	3	3	3	3	3	3	3	3	3	3
20															
22															
24															

STANDARD LONG FILLET 45° ELLS

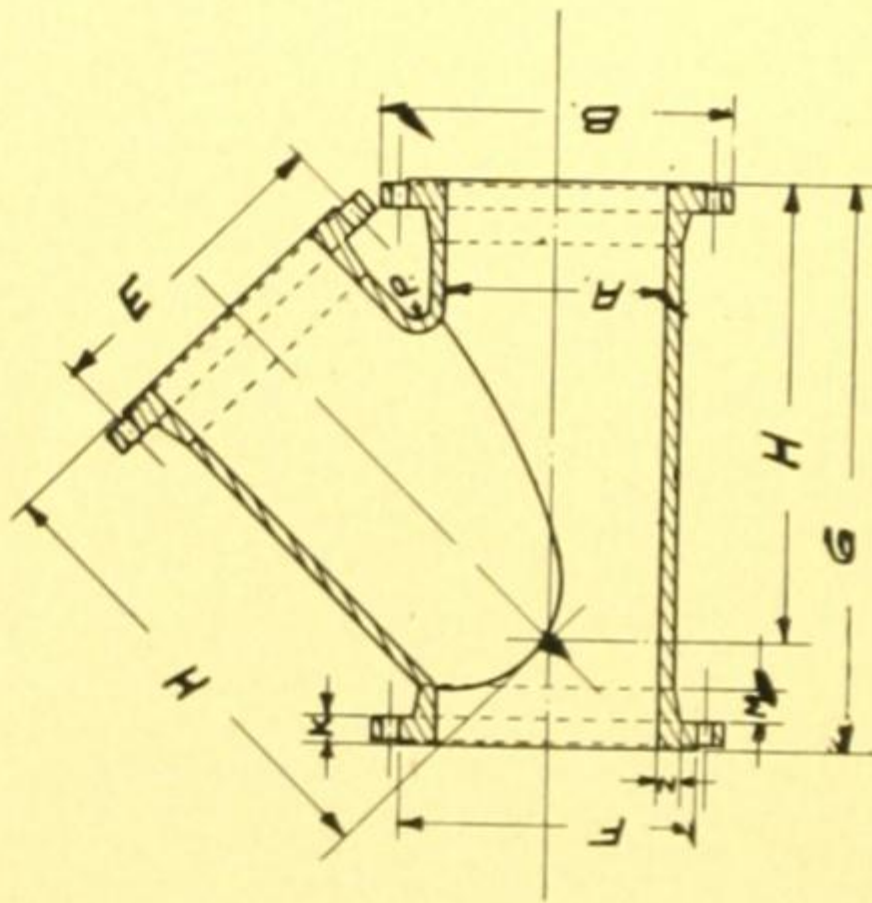
EXTRA HEAVY LONG FILLET 45° ELLS

All Bolt Holes Straddle Centers

LONG FILLET FITTINGS



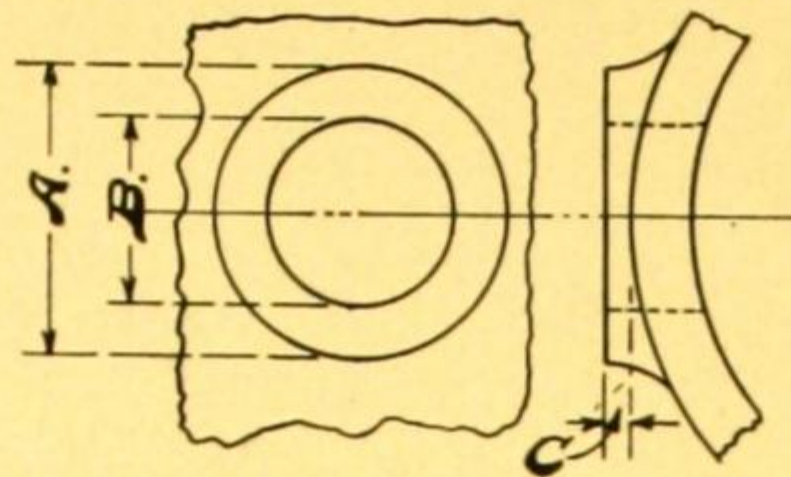
SIZE	FACE TO FACE	CENTER TO CENTER	FACE TO FACE	QD FLANGE	DIA. BOLT CIRCLE	NO. BOLTS	DIA. BOLT HOLES	THICKNESS OF FLG'S	INSIDE DIA	THICKNESS OF FILLET	LENGTH OF FILLET	M	P
8"	22	27	13	13	11	8	1"	1"	8	1"	2	1"	2
9"	24	29	15	15	12	12	1"	1"	9	1"	2	1"	2
10"	25	30	16	16	14	12	1"	1"	10	1"	2	1"	2
12"	30	34	19	19	17	12	1"	1"	12	1"	2	1"	2
14"	33	37	21	21	18	12	1"	1"	13	1"	2	1"	2
15"	34	38	22	22	20	16	1"	1"	13	1"	2	1"	2
16"	36	40	23	23	21	16	1"	1"	13	1"	2	1"	2
18"	39	43	25	25	22	16	1"	1"	15	1"	2	1"	2
20"	43	47	27	27	25	20	1"	1"	16	1"	2	1"	2
22"	46	50	28	28	27	20	1"	1"	16	1"	2	1"	2
24"	49	53	31	31	29	20	1"	1"	18	1"	2	1"	2
26"	53	57	33	33	31	24	1"	1"	18	1"	2	1"	2
28"	57	61	36	36	33	28	1"	1"	18	1"	2	1"	2
30"	60	64	38	38	36	28	1"	1"	18	1"	2	1"	2
36"													
42"													



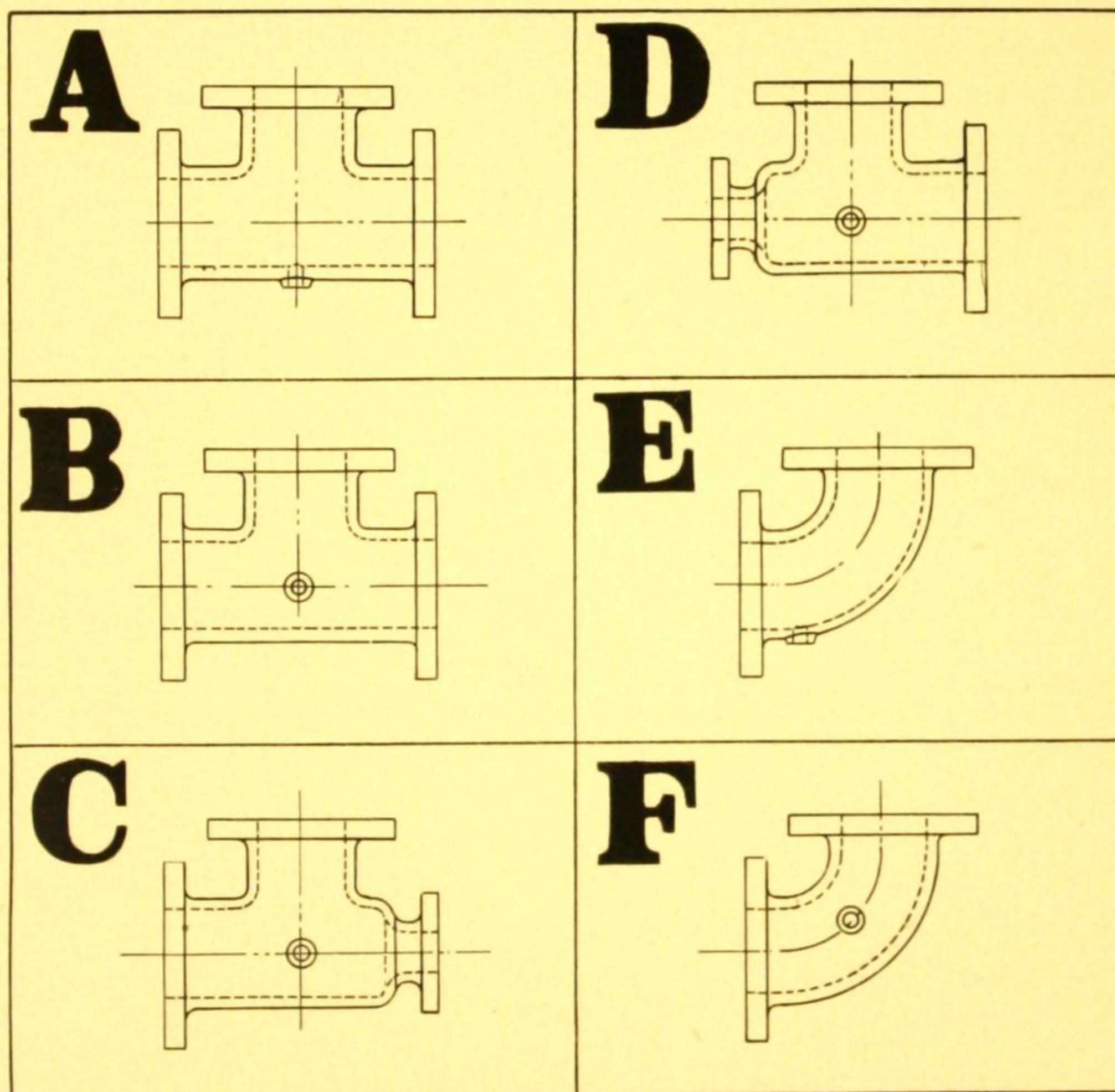
SIZE OF FITTING	FACE TO FACE	CENTER TO CENTER	FACE TO FACE	QD FLANGE	DIA. BOLT CIRCLE	NO. BOLTS	DIA. BOLT HOLES	THICKNESS OF FLG'S	INSIDE DIA	THICKNESS OF FILLET	LENGTH OF FILLET	M	P
8"	25	29	15	15	13	12	1"	1"	8	1"	2	1"	2
9"	26	30	16	16	14	12	1"	1"	9	1"	2	1"	2
10"	28	32	17	17	15	16	1"	1"	10	1"	2	1"	2
12"	32	36	20	20	17	16	1"	1"	12	1"	2	1"	2
14"	36	40	22	22	20	20	1"	1"	13	1"	2	1"	2
15"	38	42	23	23	21	20	1"	1"	14	1"	2	1"	2
16"	40	44	25	25	22	20	1"	1"	15	1"	2	1"	2
18"	44	48	27	27	24	24	1"	1"	16	1"	2	1"	2
20"													
22"													
24"													

EXTRA HEAVY LONG FILLET LATERALS
STANDARD LONG FILLET LATERALS
All Bolt Holes Straddle Centers

TAP DIMENSIONS



TAP SIZE	DIA BOSS	DIA CORE	HEIGHT BOSS	TAP SIZE	DIA BOSS	DIA CORE	HEIGHT BOSS
A	B	C		A	B	C	
1/2"	1 1/8"	—	1/4"	4"	6"	4 1/2"	3/8"
3/4"	1 1/2"	5/8"	1/4"	4 1/2"	6 3/4"	4 3/4"	3/4"
1"	2 1/4"	1 1/8"	1/4"	5"	7 1/8"	5 3/4"	7/8"
1 1/4"	2 3/4"	1 1/2"	1/4"				
1 1/2"	3"	1 1/2"	5/8"				
2"	3 1/2"	2"	3/4"				
2 1/2"	4 1/4"	2 1/2"	3/8"				
3"	4 3/4"	3 1/8"	3/8"				



STANDARD TAPPING FOR FITTINGS

REDUCING FITTINGS

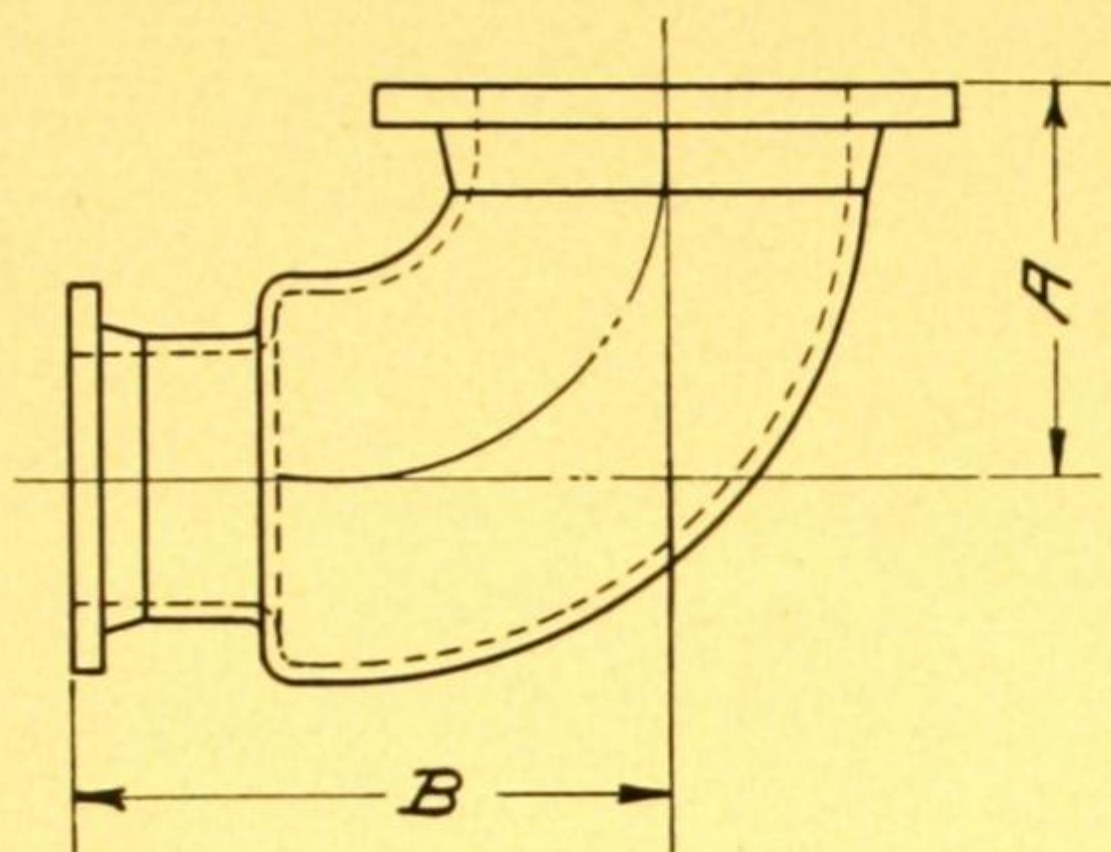
IN	OUTLET	3"	4"	5"	6"	7"	8"	9"	10"	12"	14"	15"	16"	18"	20"	22"	24"	26"	28"	30"
5"	F. to F.	16"	16"	16"																
	E. to F.	8"	8"	8"																
6"	F. to F.	17"	17"	17"	17"															
	E. to F.	8½"	8½"	8½"	8½"															
7"	F. to F.	18"	18"	18"	18"	18"														
	E. to F.	9"	9"	9"	9"	9"														
8"	F. to F.	16"	16"	20"	20"	20"	20"													
	E. to F.	10"	10"	10"	10"	10"	10"													
9"	F. to F.	16½"	16½"	16½"	21½"	21½"	21½"	21½"												
	E. to F.	10¾"	10¾"	10¾"	10¾"	10¾"	10¾"	10¾"												
10"	F. to F.	18"	18"	18"	18"	23"	23"	23"	23"											
	E. to F.	11½"	11½"	11½"	11½"	11½"	11½"	11½"	11½"											
12"	F. to F.	20¾"	20¾"	20¾"	20¾"	20¾"	20¾"	25½"	25½"	25½"										
	E. to F.	12¾"	12¾"	12¾"	12¾"	12¾"	12¾"	12¾"	12¾"	12¾"										
14"	F. to F.	21½"	21½"	21½"	21½"	21½"	21½"	21½"	28"	28"	28"									
	E. to F.	14"	14"	14"	14"	14"	14"	14"	14"	14"										
15"	F. to F.	22"	22"	22"	22"	22"	22"	22"	29½"	29½"	29½"	29½"								
	E. to F.	14¾"	14¾"	14¾"	14¾"	14¾"	14¾"	14¾"	14¾"	14¾"	14¾"	14¾"								
16"	F. to F.	23½"	23½"	23½"	23½"	23½"	23½"	23½"	23½"	31"	31"	31"	31"							
	E. to F.	15½"	15½"	15½"	15½"	15½"	15½"	15½"	15½"	15½"	15½"	15½"	15½"							
18"	F. to F.	26"	26"	26"	26"	26"	26"	26"	26"	26"	33"	33"	33"	33"						
	E. to F.	16½"	16½"	16½"	16½"	16½"	16½"	16½"	16½"	16½"	16½"	16½"	16½"	16½"						
20"	F. to F.	29"	29"	29"	29"	29"	29"	29"	29"	29"	36"	36"	36"	36"						
	E. to F.	18"	18"	18"	18"	18"	18"	18"	18"	18"	18"	18"	18"	18"						
22"	F. to F.	30¾"	30¾"	30¾"	30¾"	30¾"	30¾"	30¾"	30¾"	30¾"	30¾"	30¾"	38"	38"	38"	38"				
	E. to F.	19"	19"	19"	19"	19"	19"	19"	19"	19"	19"	19"	19"	19"	19"	19"				
24"	F. to F.	31"	31"	31"	31"	31"	31"	31"	31"	31"	31"	31"	40"	40"	40"	40"				
	E. to F.	20"	20"	20"	20"	20"	20"	20"	20"	20"	20"	20"	20"	20"	20"	20"				
26"	F. to F.	33¾"	33¾"	33¾"	33¾"	33¾"	33¾"	33¾"	33¾"	33¾"	33¾"	33¾"	33¾"	42"	42"	42"	42"			
	E. to F.	21"	21"	21"	21"	21"	21"	21"	21"	21"	21"	21"	21"	21"	21"	21"	21"			
28"	F. to F.	37½"	37½"	37½"	37½"	37½"	37½"	37½"	37½"	37½"	37½"	37½"	37½"	46"	46"	46"	46"			
	E. to F.	23"	23"	23"	23"	23"	23"	23"	23"	23"	23"	23"	23"	23"	23"	23"	23"			
30"	F. to F.	39½"	39½"	39½"	39½"	39½"	39½"	39½"	39½"	39½"	39½"	39½"	39½"	50"	50"	50"	50"	50"		
	E. to F.	25"	25"	25"	25"	25"	25"	25"	25"	25"	25"	25"	25"	25"	25"	25"	25"	25"	25"	
OUTLET	3"	4"	5"	6"	7"	8"	9"	10"		12"	14"	15"	16"	18"	20"	22"	24"	26"	28"	30"

NOTE. This Table for fittings reducing on outlet. When fittings reduce on run also, use same dimensions.

Fittings reducing on the run only have exactly the same F. to F. dimensions as they would have if they did not reduce on the run, that is, the fact that a fitting reduces on run only has no effect on its F. to F. dimensions.

KELLOGG STANDARD EXTRA HEAVY REDUCING FITTINGS

REDUCING AND LONG RADIUS ELLS



SIZE	A.	B.
5	8	
6	8½	11⅛
7	9	12
8	10	13⅝
9	10¾	14¼
10	11½	14⅞
12	12¾	16¾
14	14	17⅝
15	14¾	18¼
16	15½	19⅝
18	16½	20½
20	18	21⅞
22	19	23¼
24	20	24½
26	21	25
28	23	28
30	25	29¾

REDUCING ELLS. STANDARD AND
EXTRA HEAVY

SIZE	CENTER TO FACE	RADIUS
5	11	9⅝
6	12	10⅞
7	13½	12
8	14	12⅜
9	15	13¼
10	17	15
12	19	17
14	21	18⅞
15	22	19⅞
16	23½	21¼
18	26	23⅝
20	28	25½
22	30	27⅜
24	32	29¼
26	34	
28	36	
30	38	
32	40	
34		
36		
38		
40		

EXTRA HEAVY AND STANDARD LONG
RADIUS ELLS

